
San Francisco Medicine Waste Characterization Study

Version 1

PREPARED BY
Dr. Joel Kreisberg, DC, MA

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TELEOSIS INSTITUTE

863 Arlington Avenue
Berkeley, CA 94707
510.558.7285 Fax 510.527.1682
www.teleosis.org

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EXECUTIVE SUMMARY

This report evaluates the types of medications returned to the San Francisco Safe Medicine Disposal Pilot Program. The Pilot Program began operations in April 2012, with 23 take-back sites throughout the City and County of San Francisco. As of June 30, 2013, 20,218 pounds of expired or unwanted pharmaceuticals have been returned for disposal by incineration.

In order to evaluate the types of products disposed using the Pilot Program, a representative sample was aggregated from all 23 take-back sites. This sample was then manually inventoried under the supervision of local law enforcement. The sample consisted of one week's worth of medicine collected at each of the 13 pharmacy take-back locations and one month's worth of medicine collected at each of the 10 San Francisco police station take-back locations. The following information was collected for each item: dosage form, brand or proprietary name, active ingredient, dosage strength, prescription or over-the-counter availability, therapeutic class, DEA controlled substance class, and manufacturer.

The total weight of the aggregate sample was 472 pounds, representing 2.7% of the total weight (17,142 lbs) collected in the first year of the program. 16.8% (79.6 lbs) of the sample was identified as product packaging by weight. The total number of items identified in the inventory process was 3,193. For the purposes of the study, an "item" is defined as a container of one type of medication, like a pill bottle or a bottle of liquid medication. An "item" also represents groupings of identical loose pills returned without their original container. 5.0% of the items in the sample were identified as non-pharmaceutical products such as eye drops, eye lubricants, test strips and tea, which were removed from the statistical analysis. The total number of pharmaceutical items which could be identified and were used in all the analyses was 3,028.

As expected, pills (including tablets and capsules) are the most common form of medication returned. Pills represent 65.5% of the items in the sample. In terms of availability, 71.9% of the items returned were prescription, 23.2%, were over-the-counter, and 4.9% were nutritional products.

534 different individual products in the sample were identifiable by active ingredient. The most common active ingredients were testosterone (3.3%), sevelamer carbonate (2.6%), ibuprofen (2.5%), acetaminophen (2.1%) and albuterol sulfate (2.0%). The most common products returned by brand name were Renvela (5.9%), Testim 1% (5.5%), Levemir FlexPen (2.2%), Androgel (2.1%) and PeriGuard Antimicrobial Protectant Barrier Cream (2.1%). Renvela and Testim 1% were each represented in the sample more than twice as often as any other product.

Therapeutic class identification using the Drug Abuse Warning Network Drug Reference Vocabulary (DAWN DRV) system revealed that central nervous system (CNS) agents made up 17.4% of the sample, with analgesics, or "pain relievers," representing 70.2% of the CNS class. In fact, there were more analgesic items in the sample than any other drug class. Cardiovascular agents represented the second highest therapeutic class, identified as 11.4% of the total sample. Respiratory agents accounted for 11.1%, Psychotherapeutic agents were 10.4% and hormones were identified as the therapeutic class of 9.5% of the items in the sample.

10 of the 23 medicine collection locations in the Pilot Program are San Francisco Police Stations, which accept both controlled and non-controlled substances. 11.6% of the items identified in the sample fell into one of the five classes of controlled substances, as defined by the Drug Enforcement Administration.

274 different manufacturers produced the items in this sample. The following ten manufacturers produced over one third of the medications in the sample: Teva (7.8%); Mylan (4.2%); Watson (3.4%); Genzyme (2.8%); Sandoz (2.7%); Pfizer (2.6%); Auxilium (2.6%); Eon (2.5%); McNeil (2.3%); Abbott (2.2%); and Qualitest (2.2%). Approximately half the items in the sample were identified by a brand or proprietary name.

Comparing this sample to similar data collected in the Bay Area Medication Disposal Study of 2009 will instigate valuable discussions about the general characteristics of the unwanted or expired medicine waste stream. The results of this study will be useful in designing effective take-back or other collection programs, determining which messages should be communicated to consumers, and identifying which medications are most commonly unwanted or unused. Additional studies are needed and should be undertaken in order to fully evaluate the consumer medicine waste stream and to confirm or modify the results presented here.

INTRODUCTION

The San Francisco Safe Medicine Disposal Pilot Program is a programmatic response to the ongoing need to provide a comprehensive system for disposing expired or unwanted household pharmaceuticals. With origins in Household Hazardous Waste Facility operations beginning in 1990, take-back events beginning in 2006, and mail-back opportunities beginning in 2009, public safety, public health and environmental health officials in San Francisco have successfully set up a comprehensive citywide disposal system that provides a safe means for disposing medications. Rather than accumulating in private homes or mistakenly finding their way down the drain, residents have an accessible alternative.

This report provides a detailed look at a sample of unwanted medications collected at pharmacies and police stations throughout the City. In 2009, 1,967 pounds of pharmaceutical waste were collected through public and private programs in San Francisco¹. By the end of the first year of the current Pilot Program, 17,142 pounds have been collected and disposed of successfully. With such large quantities of waste, it is important to analyze the medications being disposed and consider ramifications for public safety, environmental health and healthcare delivery.

Under the supervision of the San Francisco Department of the Environment, the San Francisco Safe Medicine Disposal Pilot Program, through active collection and disposal, is reducing the risk of accidental poisonings, intentional misuse for recreational highs, as well as the misdirection of pharmaceuticals into the sanitary sewer collection system or solid waste collection system. This report highlights the types and quantities of these orphaned wastes, in order to inform policy makers, law enforcement and environmental health professionals of medications typically acquired through the program.

BACKGROUND

Program Administration

San Francisco's Safe Medicine Disposal Pilot Program began operation in April 2012, supported by \$110,000 in grant funding from the pharmaceutical industry and in-kind staff time from the City and County of San Francisco. San Francisco's Department of the Environment currently administers the Pilot Program in cooperation with the San Francisco Public Utilities Commission (SFPUC) and the San Francisco Police Department (SFPD). The pilot program was designed to comply with the State of California's Criteria and Procedures for Model Home-Generated Pharmaceutical Waste Collection and Disposal Programs² developed by the Pharmaceutical Working Group established by California Senate Bill 966³.

¹ Kreisberg, J, Ruhoy, I, Zheng, C, *Bay Area Medication Disposal Study 2009*. (2010) Teleosis Institute, Berkeley, CA. www.teleosis.org/services/green-pharmacy

² Household Hazardous Waste: Medication Waste Disposal, Criteria and Procedures Introduction. CalRecycle. www.calrecycle.ca.gov/homehazwaste/Medications/ModelProgram/default.htm

³ SB 966, Simitian. Pharmaceutical Drug Waste Disposal. www.leginfo.ca.gov/pub/07-08/bill/sen/sb_0951-1000/sb_966_bill_20071012_chaptered.html

History

San Francisco residents have been aware of public health and environmental issues related to medicine disposal for many years. From 1990-2005, residents who chose not to flush or toss their medications were able to dispose of them at the local Household Hazardous Waste Facility. After this program was suspended due to regulatory concerns over acceptance of controlled substances, SF Department of the Environment and the SF Public Utilities Commission held a two-day medicine collection event at 13 Walgreens locations throughout the City and County of San Francisco in 2006. This temporary collection event was organized by the Bay Area Pollution Prevention Group⁴ and coordinated with similar events at 26 other Bay Area locations. Although the event was very popular, it was unsustainable due to a lack of permanent funding.

As an alternative, the agencies distributed prepaid disposal mail-in envelopes to San Francisco residents upon request starting in 2009. With mailers costing \$3.25 and no permanent funding, this program too was unsustainable.

Though state law does not require post-consumer medicine collection programs, the weight of scientific evidence and increasing public concern about medicine disposal motivated the City to take action on this public and environmental health issue. In 2010, San Francisco Supervisors introduced the Safe Drug Disposal Ordinance based on a producer responsibility approach adopted by governments such as British Columbia. As an alternative to passage of the Ordinance, a series of stakeholder meetings yielded a creative and collaborative temporary solution: the Safe Medicine Disposal Pilot Program.

Collection Sites & Hosts

The Pilot Program relies on the voluntary efforts of San Francisco residents, pharmacies, and police stations to develop an alternative to flushing, tossing, or storing expired or unwanted medicine. The Department of the Environment recruited 13 independent pharmacies to each host an individual collection bin and the SF Police Department volunteered to accept medicines at all 10 San Francisco police stations (see Appendix A).

Pharmacy collection sites accept only non-controlled substances including prescription and over-the-counter medicines, vitamins, liquid medicines, empty inhaler cartridges, pet medicines and medicated ointments. At participating pharmacies, residents directly place their medicines to be disposed of in a mailbox-style drop-box. The pharmacy drop-boxes require two keys to unlock, which prevents diversion. Each pharmacy manager holds one key and the state-licensed medical waste hauler holds the other key.

Police stations accept controlled substances such as Vicodin®, OxyContin®, Percocet®, Ritalin®, Adderall®, Xanax®, or Valium®, in addition to non-controlled substances. Residents are required to hand all medicines directly to the officer on duty. Medicines delivered to a police station are processed as evidence (since they may contain controlled substances) and managed according to SFPD's established procedures.

Prepaid mailing envelopes are still available for residents with mobility restrictions. The envelopes are distributed on a case-by-case basis, but since collection locations are well-distributed throughout San Francisco's neighborhoods, there is little need for this relatively expensive disposal method.

⁴ Report on the San Francisco Bay Area's Safe Medicine Disposal Days, Bay Area Pollution Prevention Group. (2006). www.p2pays.org/ref/40/39862.pdf

Transport & Disposal

The Department of the Environment contracts with a state-licensed medical waste hauler, Sharps Solutions⁵, to service the participating pharmacies weekly, biweekly, or on an on call basis. Sharps Solutions transports the collected medicines to its medical waste transfer station in Hayward, CA, and then, via another medical waste transfer station in Fresno, CA, to an EPA-approved medical waste incineration facility in Anahuac, Texas.

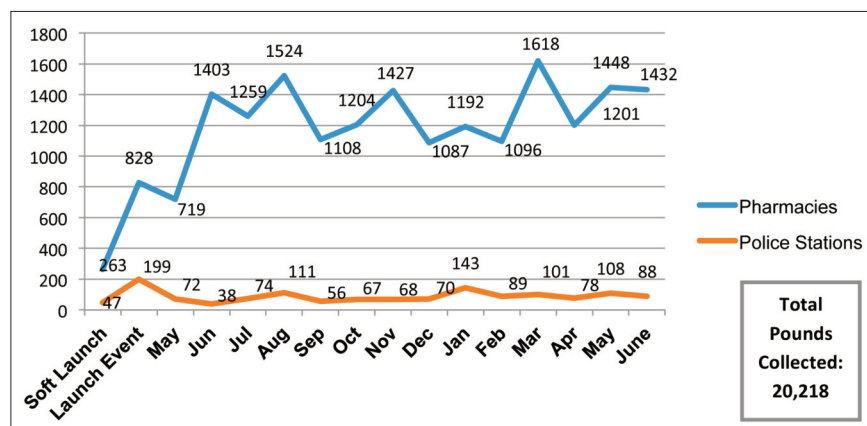
SF Police Department manages waste medicines collected at the police stations with the illicit substances that police routinely collect as evidence. All medicines collected at the ten SF police stations are transported daily to the Main Station and aggregated in the Property Room, where a designated officer separates controlled substances from non-controlled substances. The non-controlled substances are disposed of with other SFPD-generated medical waste by Stericycle,⁶ a state-licensed medical waste hauler. Controlled substances are stored in the Property Room until a uniformed officer can accompany the waste to Covanta Energy's permitted solid waste incinerator in Crows Landing, CA for witnessed destruction.

Prepaid envelopes are purchased from and returned to Sharps Compliance Inc.⁷ using their *Take Away Environmental Return System*. These envelopes are delivered to Carthage, TX, via the US Postal Service. Under proper law enforcement supervision, they are then incinerated.

Total Collection Results

Total weight collected through June 2013	20,218 pounds (~10.1 tons)
Average monthly weight collected	1,264 pounds
Average weight collected at pharmacies each month	1,176 pounds
Average weight collected at police stations each month	88 pounds

FIGURE 1. Monthly Collection By Location Type



⁵ www.sharps-solutions.com

⁶ www.stericycle.com

⁷ www.sharpsinc.com

METHODOLOGY

The identification and characterization of the items in this study was performed by Supporting Initiatives to Redistribute Unused Medicine (SIRUM)⁸ a non-profit organization based in Palo Alto, CA. SIRUM completed this study under contract with the City and County of San Francisco Department of the Environment.

Representative Sample

SIRUM sorted and characterized approximately one week's worth (1/25/13 – 2/1/13) of medicine collected from each of the program's 13 participating pharmacies, and characterized approximately one month's worth (1/1/13 – 1/31/13) of medicine collected from all 10 San Francisco Police Stations. On 2/1/13, this sample was aggregated in the San Francisco Police Department's Main Property Room, under the supervision of the Officer in Charge of Property Control. The medicine was sorted in SFPD's Property Room from 2/4/13 – 2/12/13.

On-site Sorting Process

1. Medicines were removed from medicine waste collection bins used for transportation from the pharmacies and police stations.
2. Superfluous packaging was removed and set aside to be weighed and disposed of in the conventional waste system.
3. Non-medicine items were documented and set aside for disposal.
4. Identifiable medicines in original packaging were logged directly into a spreadsheet using SIRUM's proprietary software.
 - a. National Drug Code (NDC) and Universal Packaging Code (UPC) were collected using a barcode scanner, while visible drug names, visible manufacturer name, quantities and strengths were recorded manually.
 - b. Remaining contents of identifiable containers were estimated using SIRUM's pill counting scale or a non-commercially certified scale on loan from the San Francisco Department of Public Health's Weights and Measures Program.
 - c. Using the available information, SIRUM deduced other characteristics off-site.
5. Unidentifiable, blister packed and loose medicines were grouped by size, color and shape so they could be photographed and documented.

Off-site Characterization

SIRUM utilized the U.S. Food and Drug Administration (FDA) National Drug Code (NDC) Database, Epocrates Online Pill Characteristics, Drugs.com Pill Identifier, and National Institutes of Health (NIH) National Library of Medicine Pillbox to classify items in the sample. Information collected during the characterization and additional details provided by the databases allowed SIRUM to analyze and characterize the representative sample.

Final data was correlated and updated to match the DAWN Drug Reference Vocabulary (DAWN DRV) system of tables that DAWN uses to record, code, and classify reportable substances. The DAWN DRV system is based on the Multum Lexicon, a drug vocabulary and classification tool developed and maintained by Multum Information Services, Inc.⁹

⁸ www.sirum.org

⁹ www.multum.com

RESULTS

The entire composite sample was comprised of 3,193 different items. The typical “item” is a container of medication in its original bottle. Though citizens are asked to remove medications from the original containers and combine loose medications into a single bag, it is still very common for medications to be returned in original packaging. To account for loose pills, mixed bags of pills were sorted into groupings of identical pills. Each pill grouping became a new item in the inventory, as if the entire grouping of identical pills was delivered in a single container. For the most part, this information is not reported by weight. This departs from the typical unit of measurement discussed in a municipal solid waste characterization.

TABLE 1. Total Items Inventoried

Total items* in sample	3193
Total number of collection sites in inventoried sample	23
Total weight	472 lbs

* An item represents a container of one type of medication, like a pill bottle or a bottle of liquid medication. An item also represents groupings of identical loose pills returned without their original container.

The weight of all the pharmaceuticals in the complete sample was 472 pounds. With the total pounds collected in the first year of the program being 17,142 pounds, the inventoried sample represents 2.7% of the annual quantity of medications collected in all 23 sites of the San Francisco Pilot Program. Table 2 provides data on total weight accumulated to date in the program and the size of the sample.

TABLE 2. Sample Size

Total pounds inventoried	472 lbs
Total pounds collected during first year	17,142 lbs
Total pounds collected to date	20,218 lbs
Size of sample in relation to first year collection	2.7%

Pharmaceuticals are distributed and sold in various types of delivery methods and marketing presentation, with considerable variation in packaging. In an effort to recognize the true weight of medications collected, the inventory process separated the packaging to calculate how much of the weight of the disposed product was packaging alone. Given that liquid medications were not removed from the bottles, packaging weight was not measured with complete accuracy. The sample inventoried for this report included 79.6 pounds of packaging, or 16.8% packaging by weight.

TABLE 3. Packaging by Weight

	Total Pounds	% of Total
Total weight inventoried	472.0 lbs	
Packaging	79.6 lbs	16.8%
Weight of pharmaceuticals	392.4 lbs	83.2%

Given that the take-back bins have direct access by users in pharmacies with only minimal supervision, it is not easy to control what items are deposited. Previous inventories have shown that consumers do place other items in the bins.^{10,11} This program is no exception. Of the 3193 items inventoried, 5% (165) of items inventoried were not pharmaceutical products or nutritional supplements. Most common among these items include eye drops, eye lubricants, tea and test strips. Less frequent items collected include bandages, towelettes, lip balm, peroxide, and batteries. Since these items are not pharmaceuticals, they were removed from the statistical analysis when considering concentrations of pharmaceuticals in the inventory. After removing non-pharmaceutical items from the sample, 3028 pharmaceutical items remained.

TABLE 4. Non-Pharmaceutical Items Returned

	Item	% of Total
Total items in sample	3193	
Total items unidentifiable as a pharmaceutical product	165	5%
Total items identified as a pharmaceutical product	3028	95%

¹⁰ Bay Area Medication Disposal Study 2009, See footnote 1.

¹¹ Kaye, L, Crittenden, J & Gressitt, S. *Safe Medicine Disposal for ME: A Handbook and Summary Report*. (2010) University of Maine Center for Aging. www.safemeddisposal.com/Resources.php#pubs

INVENTORY OF PHARMACEUTICALS DISPOSED

Various approaches to determining the types of products disposed of in a household medication take-back program exist. Given that pharmaceutical products are a diverse group of products in terms of type of delivery, brand or proprietary name, active ingredients, manufacturer, therapeutic class, and DEA classification for controlled substances, the current effort presents the most salient distinctions using all of these methods of identification. This is not always easy to recognize given that a certain percentage of the items were simply tablets, pills or containers with no identifiable markings.

Please note that each category in this inventory begins with the percent of the sample which was recognizable for that specific category of identification. Due the diversity of the items, not all information is available for each product. Efforts have been made to present the material in a manner easily accessible to the reader. The most significant findings are reported in the main document and the full itemized lists are offered in the appendices.

Also note that the “item” as a unit of measurement represents a container of one type of medication, like a pill bottle or a bottle of liquid medication. An item may similarly represent groupings of identical loose pills returned without their original container.

Medications Returned by Availability

Table 5 reports results in terms of percentage of prescription versus over-the-counter medications. Prescription medications are medicines requiring a medical prescription to be obtained by a consumer. Over-the-counter medications are drugs that are available to consumers without a prescription. Nutritional supplements are defined as dietary products that are designed to provide health related nutrients including vitamins, minerals, and herbal remedies, which are also available to consumers without a prescription. Of the entire sample, 92.1% (2,790) of the items were identifiable by availability. Of these 2,790 items, prescription medications represented 71.9% (2005), over-the-counter medications represented 23.2% (648), and nutritional supplements represented 4.9% (137).

TABLE 5. Medications Returned by Availability

Total items identified as pharmaceutical products	3028	100%
Total items unidentifiable by availability	238	7.9%
Total items identified as prescription, OTC, or nutritional supplement	2790	92.1%
	Items	% of total
Prescription medications	2005	71.9%
Over-the-counter medications	648	23.2%
Nutritional supplements	137	4.9%

Most Common Individual Medications Returned by Active Ingredient(s)

In total, 534 distinct individual medications were identified by active ingredient in the sample. Table 6 presents the top ten medications identified by active ingredient. Testosterone, a sex hormone, was well represented. Testosterone was present in 3.3% (90) of the items. Sevelamer carbonate, commonly used for kidney disease, was represented in 2.5% (71) of these items. The analgesics ibuprofen and acetaminophen were third and fourth respectively, with ibuprofen at 2.5% (67) and acetaminophen at 2.1% (57). Albuterol, a respiratory agent, was identified in 2.0% (53) of the sample. Please note that medications with combinations of ingredients are reported as a single distinct items, as each combination provides a different product to consumers. For example, albuterol is also found in the sixth most commonly identified active ingredient, in combination with ipratropium bromide 1.6% (44). See Appendix B for the complete list of active ingredients.

TABLE 6. Most Common Individual Medications Returned by Active Ingredient(s)

Total items identified as a pharmaceutical product	3028	
Total items unidentifiable by active ingredient	328	10.8%
Total items identified by active ingredient	2700	89.2%
Total unique individual medications identified	534	
	Items	% of total
Testosterone	90	3.3%
Sevelamer carbonate	71	2.6%
Ibuprofen	67	2.5%
Acetaminophen	57	2.1%
Albuterol sulfate	53	2.0%
Ipratropium bromide and albuterol sulfate	44	1.6%
Budesonide	40	1.5%
Triamcinolone acetonide	38	1.4%
Acetaminophen and hydrocodone bitartrate	35	1.3%
Furosemide	35	1.3%

Most Common Medications Returned by Brand or Proprietary Name

A brand name represents an identifiable manufacturer or distributor responsible for bringing the medicine to the market. A proprietary drug is a medicine that has been patented and is marketed under a brand name. A proprietary name identifies a drug as one that can only be produced and sold by the company owning that formula. In total, 591 different pharmaceutical products were identifiable by brand or proprietary name. Table 7 reports the top ten drugs identified by brand or proprietary name. Renvela 5.5% (70) and Testim 1%, 5.1% (65) were the most identified brand names of the 84% (2551) of products that could be identified in this manner. These findings closely relate to the list of most commonly returned active ingredients above. Renvela utilizes sevelamer carbonate, the second most common medication identified by active ingredient and Testim 1% utilizes testosterone, the most common medication identified by active ingredient. Please note that these two medications were found more than twice as often as any other medication identified in this sample. Also note that there is not a direct correspondence between proprietary name and active ingredient rankings. Though testosterone was present in more items than sevelamer carbonate, Renvela exclusively manufactured all of the items utilizing sevelamer carbonate as the active ingredient; whereas both Testim 1% and Androgel manufactured items utilizing testosterone.

Pharmaceuticals without brand or proprietary name are considered generic. A generic drug is often marketed under its active ingredient name without advertising. In this inventory, approximately half the items were identified with a brand or proprietary name (1184) and half were found to be generic (1367). However, there are many examples of brand name medications that are generic drugs marketed with a brand name, though this name is not proprietary. For example, acetaminophen is sold under 15 different brand names, and it is also sold simply as acetaminophen. The 15 would each be represented in the brand result and the one would be in the generic result. See Appendix C for the complete list of proprietary and brand names.

TABLE 7. Most Common Medications Returned by Proprietary or Brand Name

Total items identified as a pharmaceutical product	3028	
Total items unidentifiable by brand or proprietary name	477	15.8%
Total items identified as generic or by brand or proprietary name	2551	84.2%
Total different brand or proprietary names identified	551	
Generic drug items	1367	53.6%
Brand or proprietary name items	1184	46.4%
	Items	% of total
Renvela	70	5.9%
Testim 1%	65	5.5%
Levemir FlexPen	26	2.2%
Androgel	25	2.1%
PeriGuard Antimicrobial Protectant Barrier Cream	25	2.1%
Pulmicort Respules	15	1.3%
Lipitor	12	1.0%
Synthroid	12	1.0%
Tylenol Extra Strength	11	0.9%

Medications Returned by Therapeutic Class

Therapeutic classes group together similar medications used to treat specific types of health conditions. Therapeutic class identification is based on the Drug Abuse Warning Network Drug Reference Vocabulary (DAWN DRV) classification system. Of the 3028 pharmaceutical products in the sample, 90.4% (2737) of these items were identifiable by therapeutic class. The most common class of medications returned in the sample was central nervous system agents at 17.4% (476). Cardiovascular agents were second, representing 11.4% (305) of the identifiable items. Respiratory agents represented 11.1% (204) of items. Psychotherapeutic medications were identified as 10.4% (285), and hormones followed with 9.5% (261). These top five therapeutic classes are further identified using the next level of DAWN DRV identification, Subclass Two. The Subclass Two breakdown is detailed in Table 8.1.

TABLE 8. Medications Returned by Therapeutic Class

	Items	% of total
Total items identified as pharmaceutical products	3028	
Total items unidentifiable by therapeutic class	291	9.6%
Total items identified by therapeutic class	2737	90.4%
Therapeutic Class	Items	% of total
Central Nervous System Agents	476	17.4%
Cardiovascular Agents	305	11.4%
Respiratory Agents	304	11.1%
Psychotherapeutic Agents	285	10.4%
Hormones	261	9.5 %
Topical Agents	224	8.2%
Gastrointestinal Agents	205	7.5%
Metabolic Agents	196	7.2%
Anti-infectives	151	5.5%
Nutritional Products	124	4.5%
Miscellaneous Agents	109	4.0%
Coagulation Modifiers	89	3.3%
Anti-neoplastics	6	0.2%
Alternative Medicine	1	0.05%
Immunologic Agents	1	0.05%

TABLE 8.1. Breakdown of the Five Most Common Therapeutic Classes

Therapeutic Class	Items	% of total
Central Nervous System Agents	476	%
Analgesics	334	70.2%
Anticonvulsants	58	12.2%
Antiemetic/antivertigo agents	41	8.6%
Muscle relaxants	23	4.8%
Miscellaneous CNS agents	12	2.5%
Antiparkinson agents	8	1.7%
Cardiovascular Agents	305	%
Cardiovascular agents	152	49.8%
Beta-adrenergic blocking agents	60	19.8%
Diuretics	52	17.0%
Calcium channel blocking agents	35	11.5%
Antiadrenergic agents, centrally acting	6	2.0%
Respiratory Agents	304	%
Bronchodilators	145	47.7%
Respiratory agents	67	22.0%
Upper respiratory combinations	67	22.0%
Decongestants	13	4.3%
Expectorants	12	3.9%
Psychotherapeutic Agents	285	%
Antidepressants	113	39.6%
Anxiolytics, sedatives, and hypnotics	101	35.4%
Antipsychotics	58	20.4%
Central nervous system stimulants	13	4.6%
Hormones	261	%
Sex hormones	129	49.4%
Adrenal cortical steroids	88	33.7%
Thyroid Drugs	32	12.3%
Bisphosphonates	8	3.1%
Miscellaneous hormones	4	1.5%

Most Common Medications Returned by Manufacturer or Distributor

A total of 274 manufacturers or distributors were identified. Table 9 summarizes the 11 most represented corporate entities that bring the drugs to the end user – the consumer. 82.3% (2493) of the items in the sample were identifiable by the manufacturer or distributor. Teva with 7.8% (194), Mylan with 4.2% (104) and Watson with 3.4% (85) were the top three manufacturers respectively; all are companies producing generic drugs. However, there are also manufacturers producing proprietary or brand name products on the list below, including Pfizer, McNeil, and Abbott. Other companies listed below produce(d) both proprietary or brand name and generic products, such as Watson Laboratories. See Appendix D for the complete list.

TABLE 9. Most Common Medications Returned by Manufacturer or Distributor

Total items identified as pharmaceutical products	3028	
Total items unidentifiable by manufacturer or distributor	535	17.7%
Total items identified by manufacturer or distributor	2493	82.3%
Total number of manufacturers or distributors identified	274	
	Items	% of total
Teva	194	7.8%
Mylan	104	4.2%
Watson	85	3.4%
Genzyme	71	2.8%
Sandoz	68	2.7%
Pfizer	66	2.6%
Auxilium	65	2.6%
Eon	63	2.5%
McNeil	58	2.3%
Abbott	56	2.2%
Qualitest	56	2.2%

Medications Returned by DEA Designation

Controlled substances are generally drugs whose manufacture, possession or use is regulated by the Comprehensive Drug Abuse Prevention and Control Act of 1970¹² under the supervision of the DEA and the FDA. Since the San Francisco Pilot Program includes police station take-back locations that offer proper law enforcement supervision, controlled substances are returned in compliance with federal law. Police stations collect far less unwanted medicines than pharmacies—1176 pounds average per month at pharmacies (13) versus 88 pounds per month at police stations (10). The sample inventoried in this study represented one month's collection of pharmaceutical waste from 10 police stations and one week of pharmaceutical waste collected at 13 waste pharmacies. Of the 3028 items identified as pharmaceutical products, 91.6% (2773) were identifiable by their DEA designation. The total percentage of items identified as controlled substances was 11.6% (322).

TABLE 10. Medications Returned by DEA Designation

Total items identified as a pharmaceutical product	3028	
Total items unidentifiable as controlled or non-controlled	255	8.4%
Total items identified as controlled or non-controlled	2773	91.6%
	Items	%
Non-controlled substances	2451	88.4%
Controlled substances	322	11.6%

¹² Controlled Substances Act, US. Food and Drug Administration. www.fda.gov/RegulatoryInformation/Legislation/ucm148726.htm

Medications Returned by Dosage Form

Identifying unused pharmaceuticals by delivery form offers a useful perspective, particularly for waste handlers. All 3028 (100%) of the items identified as pharmaceutical products were identified by the dosage form in the table below. Table 11 shows that the most common medication types returned in the sample were pills, capsules or tablets, comprising 65.5% (1983) of the medications collected. The second most common type of medication returned were liquids, comprising 13.5% (409); this also includes solutions, suspensions, syrups and lotions. Ointments, paste and creams represent 9.8% (297) of the items identified in the sample. Powders follow with 4.4% (132). Injectables were found in 3.2% (96) of the sample, and aerosols, suppositories, inhalers, patches and a few others represent 3.7% combined.

TABLE 11. Medications Returned by Dosage Form

Total items identified as pharmaceutical products	3028	100%
	Items	% of total
Pills, tablets, capsules	1983	65.5%
Liquid, solutions, suspensions, syrups, lotions	409	13.5%
Ointment, paste, creams	297	9.8%
Powder	132	4.4%
Injectables	96	3.2%
Aerosols	54	1.7%
Suppositories	20	0.7%
Inhalers	18	0.6%
Patch	14	0.5%
Miscellaneous	5	0.2%

DISCUSSION

In order to better understand the data presented in this study, key findings are compared to *The Bay Area Medication Disposal Study 2009*¹³ (Bay Area Study). The Bay Area Study used samples collected from three different collection sites in the San Francisco Bay Area, offering insight into the quantities and types of medicines collected. Since the data from this previous study was analyzed in a similar manner, the data is comparable.

Weight of Waste Collected

In 2009, as reported in the Bay Area Study, San Francisco had only two collection sites and a mail-back program, which reported 1969 pounds of waste medicine collected from over 800,000 residents. At that time, San Mateo County, with a slightly smaller population of over 700,000 residents, collected 17,778 pounds of pharmaceutical waste from 16 sites throughout the county. San Mateo's program was one of the first comprehensive programs in California, with all municipalities in the county operating at least one take-back site in each respective police station. San Francisco, with 17,142 pounds in its first year at 23 sites, shows a comparable quantitative result as San Mateo. The program is reaching the community and providing a vital service. It will be interesting to see if the average rate of 1,264 pounds per month grows as consumers become more familiar with the program. Is the current number of collection sites sufficient to provide proper service for the City's population? Assessments over several years will be required to better understand the optimal number of take-back sites necessary to serve the current population in this jurisdiction.

Prescription Medications, Over-the-Counter Medications, and Nutritional Supplements

As previously reported, the *Bay Area Medication Disposal Study 2009* found that prescription medications consisted of 64.6% of the total sample inventoried. The current sample from the San Francisco Pilot Program has a higher percentage of prescription medications with 71.9% of items identified. Why the shift to a higher percentage of prescription medications? Is this a trend or a variation across samples? Again, sampling over several years will be needed to provide the necessary data to draw a conclusion. In terms of OTC, the 2009 sample included 25% OTC items compared with the current sample, which identified 23.2% of items as OTC, a negligible difference. In terms of nutritional supplements, the 2009 samples found 10% nutritional supplements, while the current sample found only 4.9%, half the amount returned in the previous report. These two data points do not allow for any conclusions at this time. Considering the high cost of disposal through a take-back system and little evidence that supplements should be disposed of using incineration, a smaller percentage returned could be a positive finding. Another factor to consider is that nutritional supplements often lack markings which allow them to be identified easily. Perhaps a significant portion of the unidentifiable items (238) might have been nutritional supplements. If this were the case, nutritional supplements could represent above 10% of items in the sample, similar to previous findings.

¹³ Bay Area Medication Disposal Study 2009, see footnote 1.

Brand and Proprietary Named Medications

There is little data available on expired or unwanted medications which identifies those products as proprietary, brand name or generic. One would expect a higher percentage of generic medications due to the fact that generics represent a far greater percentage of overall sales in the US, estimated at 80%. In this study, generics and brand named pharmaceuticals were represented equally. However, there are many brand names represented that are not proprietary. It would be of value to collect and examine the data more thoroughly to better understand the distinctions. In terms of manufacturers' vital role in supporting and managing take-back programs, this result points to shared responsibility across all drug makers.

Therapeutic Class

In the Bay Area Study, the two largest classes of drugs returned were respiratory agents (19.9%) and central nervous system agents (16.6%), as defined by DAWN DRV. In this current study, respiratory agents only represented 11.1% of the items in the sample, making this group the third most commonly returned type of medicine, and indicating a significant drop in the number of items used for this purpose from the 2009 study's sample. Central nervous system agents remained relatively unchanged with 17.4% of the current sample compared to 16.6% reported in 2009. Similarly unchanged was the number of items returned that are used as psychotherapeutic agents, with 10.4% in this sample and 9.9% in the previous Bay Area sample.

More significant differences were found with cardiovascular agents, representing the second most common class of medications returned in the San Francisco sample at 11.4%, while previously only 6.6% of the Bay Area samples. Hormones were also represented in greater proportion, comprising 9.5% of the current sample, versus 4.0% from the Bay Area-wide data.

Are these variations regional? Seasonal variations? Sample variations? Sampling over several years will provide the data necessary to draw concrete conclusions. This information does offer an opportunity for clinical healthcare providers to examine patterns of prescribing and how this may lead to waste. Learning about which medications routinely expire before they are used, and which medications are disposed should save resources and inform modifications to medical services. This data set is well demarcated to the City and County of San Francisco, in which healthcare institutions have a very strong presence. Researchers should find value in this information for epidemiological and clinical considerations as well.

Controlled Substances

Policy makers wrestle often with the percentage of controlled substances in household pharmaceutical waste. There is little agreement as to how often controlled substances expire or become unwanted by patients to whom they are prescribed. Literature on this subject is not well developed to date. Data sets are small or non-existent. This current study provides a clear measure of the percentage of controlled substances—11.6% of the items inventoried. This finding is useful, providing one good data point in the ongoing question of overall percentage of controlled substances in need of disposal. Please note that the sample inventoried contained a disproportionate amount of medicine waste delivered to police stations. The sample inventoried for this study included one week of pharmacy medicine waste,

expected to contain only non-controlled substances, and one month of police station medicine waste, expected to contain many controlled substances. Still, this study provides a useful data point on what is and is not present in the medicine waste stream.

Since all of the samples in the previous Bay Area study were taken from sites that do not accept controlled substances, no or insignificant amounts of controlled substances were found in 2009. Since 11.6% of medicines returned in this sample are controlled substances, it is clear that collecting controlled substances is a necessary part of the take-back program. It can be argued that operating a take-back program that does not accommodate controlled substances accentuates the problem of controlled substances accumulating in homes by isolating them from the medicine waste stream. This simply highlights their presence, increasing their potential for misuse.

Questions That Remain

The data collected here serves the larger focus of understanding what medications go unused by consumers. This literature is growing and this report offers another step in understanding this process. Questions continue to emerge from examining this data. What percentage of actual prescriptions filled or medicine purchased does this represent in this jurisdiction? Are there seasonal variations as to what medications individuals need to dispose? How does access to take-back sites affect accumulations in the home? Will reducing household accumulations reduce accidental poisonings? Will proper disposal reduce the prevalence of teenage prescription drug abuse? Will proper disposal reduce concentrations entering sewage treatment plans?

In terms of programmatic considerations, it can be argued that this data suggests the need to regularly assess the composition of medicines collected. While adherence to medication schedules is not solely the business of drug manufacturers, as value driven companies that provide health services, understanding the full life cycle of these products could inform the design of more complete systems for stewardship of manufactured products.

CONCLUSION

Since the publication of the *Bay Area Medication Disposal Study 2009*, the landscape for take-back programs has changed considerably. In the last year, two landmark ordinances have been passed, the Alameda County Safe Medication Disposal Ordinance, and more recently, similar regulations in Kings County, WA. In the US, cities, counties and states are now considering legislation as a tool for providing a comprehensive disposal system for expired or unwanted household pharmaceuticals. Currently, there are no take-back regulations in place at the state level, yet there have been bills requiring safe medication disposal in state house committees in nine states and at least one bill was considered in committee in the U.S. House of Representatives.

This report presents a detailed look at the identifying features of household pharmaceutical waste in San Francisco. Key findings include:

- 71.9% of items identified in the sample were prescription medications.
- Testosterone (3.3%), sevelamer carbonate (2.5%), ibuprofen (2.5%), acetaminophen (2.1%) and albuterol (2.0%) were the most commonly returned active ingredients that were identified in the sample.
- Renvela (5.9%) and Testim 1% (5.5%) were the most common proprietary or brand name medications returned by a large margin.
- Teva represented the most commonly identified manufacturer (7.8%) in the sample.
- The three most common therapeutic classes represented were central nervous system agents (17.4%), cardiovascular agents (11.4%), and respiratory Agents (11.1%).
- Controlled substances were identified as 11.6% of the items returned.

Please keep in mind that the “item” as a unit of measurement represents a container of one type of medication, like a pill bottle or a bottle of liquid medication. An item may similarly represent groupings of identical loose pills returned without their original container.

With a total of 472 pounds of waste inventoried, representing 2.7% of the total 17,142 pounds collected in the first year at 23 take-back sites currently operating in San Francisco, the sample is of significant enough size to provide an accurate characterization of the waste collected in the first year. Is there something more to learn from this data? While the data suggests that regular assessment of this type of data will provide clearer and more accurate trends, the data also suggests that additional information should be collected. In the future, policy makers and funders would benefit from knowing qualitative data about the characteristics of users of the program, particularly in terms of complying with pharmacists' instructions as well as patterns of accumulation in homes. Since the current program is successfully utilized by San Francisco residents, a written survey would provide a more complete picture of why these medications need to be disposed. Why are they unused? Did they expire? What percentage of prescriptions issued in the jurisdiction do they represent? And what are the health demographics that go along with the users for the program?

Some still say, why bother, there is no harm in throwing unwanted drugs in the landfill. Others point out that using the term ‘drug’ or ‘medicine’ is too simplistic, that ‘pharmaceuticals’, the technical term, are a broad class of highly specialized, technologically advanced substances, designed to be biologically active in powerful ways. If they are so powerful, why would we believe that there is little consequence in tossing these diverse chemicals, more than 1300 individual compounds, directly into waste streams? Producers who develop, manufacture and handle these products often offer the perspective that there is little evidence of harm. Everyone would agree, in 21st century America, we

should not have to live without these lifesaving medications. Yet, as our deepening understanding of complex systems evolves, we are learning more about unintended consequences. As public health policies mature, we continue to learn the value of precaution and prevention.

In 2010, public officials in San Francisco undertook the complex task of providing a new service to its citizens. These officials were breaking ground in developing an innovative program providing safety for the citizens of San Francisco, as well as precaution for the environment, an essential determinant of our overall health. Citizens are actively using the service, and we know how these wastes are being handled. The interim goal of the Pilot Program is to provide residents with a convenient and safe disposal option for unwanted medicine. Without the data and analysis provided by this report, there was no certainty that the Pilot Program was operating as intended. For now, it is clear that the Pilot Program is working as intended by removing medications from medicine cabinets and preventing them from entering the environment. Further examination of the data will be required to reveal how the aforementioned findings affect future program operations and shape the design of a permanent disposal program in San Francisco. Future replication of this study will be necessary in many cities, counties and states to develop an effective disposal system for unwanted or expired medications nationwide.

APPENDICES

Appendix A: Safe Medicine Disposal Pilot Program Collection Network

Central Drug Store

4494 Mission St.
SF, CA 94112

AHF Pharmacy

4071 18th St.
SF, CA 94114

SFPD - Park Station

1899 Waller St.
SF, CA 94117

Charlie's Pharmacy

1101 Fillmore St.
SF, CA 94115

Post Divisadero Medical Pharmacy

2299 Post St.
SF, CA 94115

SFPD - Richmond Station

461 6th Ave.
SF, CA 94118

Clay Medical Pharmacy

929 Clay St. #103
SF, CA 94108

Torgsyn Discount Pharmacy Inc.

5614 Geary Blvd.
SF, CA 94121

SFPD - Southern Station

850 Bryant St.
SF, CA 94103

Daniels Pharmacy

943 Geneva Ave.
SF, CA 94112

Visitation Valley Pharmacy

100 Leland Ave.
SF, CA 94134

SFPD - Taraval Station

2345 - 24th Ave.
SF, CA 94116

Four Fifty Sutter

450 Sutter St. #712
SF, CA 94108

SFPD - Bayview Station

201 Williams St.
SF, CA 94124

SFPD - Tenderloin Station

301 Eddy St.
SF, CA 94102

Franklin Pharmacy

1508 Franklin St.
SF, CA 94109

SFPD - Central Station

766 Vallejo St.
SF, CA 94133

Golden Gate Pharmacy

1844 Noriega St.
SF, CA 94122

SFPD - Ingleside Station

1 John V. Young Ln.
SF, CA 94112

Joe's Pharmacy

5199 Geary Blvd.
SF, CA 94118

SFPD - Mission Station

630 Valencia St.
SF, CA 94110

Los Portales Pharmacy

2480 Mission St. #110
SF, CA 94110

SFPD - Northern Station

1125 Fillmore St.
SF, CA 94115

Appendix B. Complete List of Individual Medications Returned by Active Ingredient(s)

	Items	% of total
Total items identified as pharmaceutical products	3028	
Total items unidentifiable by active ingredient	328	10.8%
Total items identified by active ingredient	2700	89.2%
Total unique individual medications identified	534	

Individual Medication/Active Ingredient	# items	Individual Medication/Active Ingredient	# items
Testosterone	90	Morphine	19
Sevelamer carbonate	71	Warfarin	18
Ibuprofen	67	Atorvastatin	17
Acetaminophen	57	Hydrocortisone	17
Albuterol sulfate	53	Ciprofloxacin	15
Ipratropium bromide and albuterol sulfate	44	Famotidine	15
Budesonide	40	Fluoxetine	14
Triamcinolone acetonide	38	Oxycodone	14
Acetaminophen and hydrocodone bitartrate	35	Bismuth subsalicylate	13
Furosemide	35	Fluticasone propionate	13
Aspirin	32	Haloperidol	13
Heparin	28	Polyethylene glycol	13
Gabapentin	27	Prednisolone	13
Levothyroxine	27	Pseudoephedrine	13
Insulin detemir	26	Quetiapine	13
Ipratropium bromide	26	Glipizide	12
Lorazepam	26	Guaifenesin	12
Zinc oxide	25	Loperamide	12
Docusate	23	Meclizine	12
Simvastatin	23	Metoprolol tartrate	12
Lisinopril	22	Temazepam	12
Bupropion	21	Amitriptyline	11
Acetaminophen and codeine phosphate	20	Bisacodyl	11
Amlodipine besylate	20	Colesevelam	11
Naproxen	20	Diclofenac sodium	11
Omeprazole	20	Ranitidine	11
Ondansetron	20	Sertraline	11
Diphenhydramine	19	Simethicone	11
Metformin	19	Alprazolam	10

Individual Medication/Active Ingredient	# items	Individual Medication/Active Ingredient	# items
Carvedilol	10	Cetirizine	7
Dextromethorphan and guaifenesin	10	Citalopram	7
Gentamycin	10	Dextromethorphan, pheniramine and phenylephrine	7
Hydralazine	10	Diltiazem	7
Hydrochlorothiazide	10	Donepezil	7
Metronidazole	10	Doxycycline hyclate	7
Nabumetone	10	Duloxetine	7
Potassium chloride	10	Epinephrine	7
Acetaminophen and oxycodone	9	Fluticasone and salmeterol	7
Acetaminophen, chlorpheniramine and phenylephrine	9	Hydroxyzine	7
Bacitracin zinc and polymyxin B sulfate	9	Labetalol	7
Cyclobenzaprine	9	Lidocaine	7
Divalproex sodium	9	Mometasone	7
Insulin aspart	9	Tramadol	7
Loratadine	9	Trazadone	7
Metoprolol	9	Venlafaxine	7
Prochlorperazine maleate	9	Acetaminophen and diphenhydramine	6
Amoxicillin	8	Allopurinol	6
Amphetamine and dextroamphetamine	8	Benazepril	6
Atenolo	8	Benzonatate	6
Atropine sulfate	8	Clindamycin	6
Bacitracin	8	Codeine and guaifenesin	6
Bacitracin, neomycin and polymyxin B	8	Diazepam	6
Baclofen	8	Emollients topical	6
Clotrimazole	8	Esomeprazole	6
Estradiol	8	Fluocinonide	6
Gemfibrozil	8	Human insulin	6
Losartan potassium	8	Metoclopramide	6
Lovastatin	8	Montelukast	6
Mirtazapine	8	Niacin	6
Nitroglycerin	8	Oxymetazoline	6
Olanzapine	8	Pantoprazole	6
Pravastatin sodium	8	Phenol	6
Sulfamethoxazole and trimethoprim	8	Pregabalin	6
Tretinoin	8	Propranolol	6
Zolpidem	8	Sennosides	6
Acetaminophen and propoxyphene napsylate	7	Tamsulosin	6
Atropine sulfate and diphenoxylate	7	Alendronate	5
		Ascorbic acid	5

Individual Medication/Active Ingredient	# items	Individual Medication/Active Ingredient	# items
Capsaicin	5	Gentamicin sulfate	4
Celecoxib	5	Insulin glargine	4
Clopidogrel	5	Lactulose	4
Dexamethasone	5	Lamotrigine	4
Digoxin	5	Medicinal cannabis	4
Estrogens conjugated	5	Milnacipran	4
Fentanyl	5	Mupirocin	4
Isosorbide mononitrate	5	Ofloxacin	4
Ketoconazole	5	Risperidone	4
Meloxicam	5	Rosuvastatin	4
Methimazole	5	Royal jelly	4
Moxifloxacin	5	Telmisartan	4
Nortriptyline	5	Terazosin	4
Oxybutynin chloride	5	Tetracycline	4
Promethazine	5	Tiotropium bromide	4
Promethazine and codeine phosphate	5	Verapamil	4
Salmeterol xinafoate	5	Acetaminophen, diphenhydramine	
Sodium chloride	5	and pseudoephedrine	3
Spironolactone	5	Acetazolamide	3
Sucralfate	5	Amoxicillin and clavulanate potassium	3
Topiramate	5	Aspir-low	3
Valsartan	5	Azelastine	3
Zolpidem tartrate	5	Betamethasone and clotrimazole	3
Acetaminophen and hydrocodone	4	Brompheniramine, dextromethorphan	
Acetaminophen, dextromethorphan		and phenylephrine	3
and doxylamine	4	Calcium carbonate	3
Acetaminophen, dextromethorphan		Calcium citrate	3
and phenylephrine	4	Carisoprodol	3
Amiodarone	4	Chlorpheniramine and pseudoephedrine	3
Amoxicillin trihydrate	4	Chlorpheniramine maleate	3
Aripiprazole	4	Cinacalcet	3
Azithromycin	4	Clarithromycin	3
Beclomethasone dipropionate	4	Clobetasol propionate	3
Calcium and vitamin D	4	Clonidine	3
Cephalexin monohydrate	4	Colchicine	3
Doxazosin mesylate	4	Dexlansoprazole	3
Escitalopram	4	Dronedarone	3
Ferrous sulfate	4	Enalapril maleate	3
Finasteride	4	Etodolac	3
Flunisolide	4	Fluconazole	3

Individual Medication/Active Ingredient	# items	Individual Medication/Active Ingredient	# items
Hydrochlorothiazide and irbesartan	3	Clonazepam	2
Hydrochlorothiazide and lisinopril	3	Desloratadine	2
Hydrochlorothiazide and losartan	3	Desonide	2
Hydrochlorothiazide and triamterene	3	Dextromethorphan	2
Lansoprazole	3	Diphenhydramine and zinc acetate	2
Lidocaine and epinephrine	3	Econazole nitrate	2
Losartan	3	Entacapone	2
Lubiprostone	3	Estradiol valerate	2
Megestrol acetate	3	Estrogens conjugated	
Mesalamine	3	and medroxyprogesteron	2
Methylphenidate	3	Ethinyl estradiol and levonorgestrel	2
Neomycin sulfate, polymyxin B sulfate, and dexamethasone	3	Ethinyl estradiol and norethindrone	2
Omega-3 polyunsaturated fatty acids	3	Ezetimibe	2
Oseltamivir	3	Ezetimibe and simvastatin	2
Phenazopyridine	3	Felodipine	2
Pramoxine, phenylephrine, glycerin and petrolatum	3	Fexofenadine	2
Prochlorperazine suppositories	3	Fludrocortisone	2
Progesterone	3	Flumetasone	2
Progesterone ethyl oleate	3	Fluoride	2
Quinapril	3	Fluticasone furoate	2
Raloxifene	3	Fusidic acid	2
Sildenafil	3	Glimepiride	2
Sitagliptin	3	Glucose	2
Sulfacetamide sodium	3	Glycopyrrolate	2
Vilazodone	3	Guaifenesin and phenylephrine	2
Acarbose	2	Guanfacine	2
Acetaminophen and tramadol	2	Herbal supplement	2
Acetaminophen, caffeine and pyrilamine maleate	2	Hydrochlorothiazide and losartan potassium	2
Acyclovir	2	Hydrochlorothiazide and olmesartan	2
Amlodipine and olmesartan	2	Hydrocortisone acetate and pramoxine	2
Brimonidine tartrate	2	Hydromorphone	2
Budesonide and formoterol	2	Hydroxychloroquine sulfate	2
Carbidopa and levodopa	2	Irbesartan	2
Ceftazidime	2	Levalbuterol tartrate	2
Chlorhexidine gluconate	2	Levetiracetam	2
Cholecalciferol	2	Levofloxacin	2
Chondroitin and glucosamine	2	Linacotide	2
		Lysine	2
		Medroxyprogesterone acetate	2

Individual Medication/Active Ingredient	# items	Individual Medication/Active Ingredient	# items
Melatonin	2	Acetaminophen, dextromethorphan	
Memantine	2	and pseudoephedrine	1
Metformin and pioglitazone	2	Acetaminophen, dextromethorphan,	
Methocarbamol	2	doxylamine and pseudoephedrine	1
Methyl salicylate	2	Acetaminophen, diphenhydramine	
Minocycline	2	and phenylephrine	1
Minoxidil	2	Acetaminophen, doxylamine succinate	
Nadolol	2	and phenylephrine	1
Neomycin sulfate, polymyxin B sulfate,		Acetaminophen, guaifenesin	
bacitracin zinc and hydrocortisone	2	and pseudoephedrine	1
Nisoldipine	2	Acetaminophen, pamabrom	
Nitrofurantoin	2	and pyrilamine	1
Nitrofurantoin monohydrate	2	Al hydroxide, hydroxide and simethicone	1
Nystatin	2	Alendronate and cholecalciferol	1
Olmesartan	2	Aliskiren and amlodipine	1
Oxymorphone	2	Aliskiren and hydrochlorothiazide	1
Penicillin	2	Aliskiren and valsartan	1
Penicillin V potassium	2	Aluminum hydroxide and	
Phenobarbital	2	magnesium carbonate	1
Pioglitazone	2	Amantadine	1
Polymyxin B and trimethoprim	2	Amlodipine, hydrochlorothiazide	
Pramipexole	2	and valsartan	1
Prenatal multivitamin	2	Antihemophilic factor	1
Prochlorperazine	2	Atovaquone and proguanil	1
Rifaximin	2	Augmentin	1
Risedronate sodium	2	Azelaic Acid	1
Rivastigmine	2	Bactr	1
Salsalate	2	Balsalazide disodium	1
Scopolamine	2	Belladonna alk-phenobarbital	1
Solifenacin	2	Belladonna, ergotamine and phenobarbital	1
Timolol maleate	2	Benzocaine and dextromethorphan	1
Valacyclovir	2	Benzocaine	1
Vancomycin	2	Benzoyl peroxide	1
Zinc oxide and menthol	2	Betamethasone dipropionate	1
Abacavir	1	Bifidobacterium infantis	1
Acetaminophen and pamabrom	1	Brinzolamide ophthalmic	1
Acetaminophen and phenylephrine	1	Bromfenac	1
Acetaminophen, aspirin and caffeine	1	Caffeine	1
Acetaminophen, butalbital and caffeine	1	Calamine and pramoxine	1
Acetaminophen, chlorpheniramine		Calcium acetate	1
and pseudoephedrine	1		

Individual Medication/Active Ingredient	# items	Individual Medication/Active Ingredient	# items
Calcium carbonate, famotidine and magnesium hydroxide	1	Doxylamine	1
Carbamide peroxide	1	Drotaverine	1
Centrum	1	Dutasteride	1
Cephradine	1	Emtricitabine and tenofovir disoproxil fumarate	1
Cevimeline	1	Eplerenone	1
Chloramphenicol ophthalmic	1	Erythromycin	1
Chlordiazepoxide	1	Ethinyl estradiol	1
Chloroquine phosphate	1	Ethinyl estradiol and norgestimate	1
Chlorothiazide	1	Evening primrose	1
Choline salicylate and magnesium salicylate	1	Febuxostat	1
Chondroitin, glucosamine and methylsulfonylmethane	1	Fenofibrate	1
Ciclesonide	1	Fexofenadine and pseudoephedrine	1
Clemastine and phenylpropanolamine	1	Fluocinolone acetonide	1
Clocortolone pivalate	1	Flurazepam	1
Compound diclofenac sodium and chlorphenamine maleate	1	Fluvoxamine maleate	1
Cromoglicic acid disodium salt	1	Folic acid	1
Cromolyn sodium	1	Fosinopril sodium	1
Crotamiton	1	Frovatriptan	1
Cyclophosphamide	1	Gabapentin enacarbil	1
Cyproheptadine	1	Garlic	1
Dabigatran	1	Gatifloxacin	1
Dantrolene sodium	1	Glyburide	1
Desipramine	1	Granisetron	1
Desmopressin	1	Griseofulvin ultramicrocrystalline	1
Desogestrel and ethinyl estradiol	1	Guaifenesin and pseudoephedrine	1
Desvenlafaxine	1	Guaifenesin-phenylpropanolamine	1
Dexmethylphenidate	1	Homatropine and hydrocodone	1
Dextrose, fructose and phosphoric acid	1	Hydrochlorothiazide and quinapril	1
Diclofenac epolamine	1	Hydrochlorothiazide and telmisartan	1
Dicloxacillin sodium	1	Hydrochlorothiazide and valsartan	1
Dicyclomine	1	Hydrocodone	1
Diflunisal	1	Hydrocodone bitartrate	1
Dimenhydrinate	1	Hydroquinone	1
Docosanol	1	Hyoscyamine sulfate	1
Dolasetron	1	Imipramine	1
Dorzolamide	1	Indapamide	1
Doxepin	1	Indomethacin	1
		Infant drops	1
		Insulin	1

Individual Medication/Active Ingredient	# items	Individual Medication/Active Ingredient	# items
Insulin lispro	1	Antimony potassium tartrate,	
Inulin	1	bryonia alba root,	
Iodine	1	protortonia cacti,	
Ivermectin	1	drosera rotundifolia,	
Ketoprofen	1	ippecac, pulsatilla vulgaris,	
Ketorolac tromethamine	1	rumex crispus root,	
Ketotifen fumarate	1	spongia officinalis skeleton,	
Lactase	1	roasted and lobaria pulmonaria	1
Lanthanum carbonate	1	Nystatin and triam	1
Letrozole	1	Onion, apis mellifera, atropa belladonna,	
Levobunolol	1	eupatorium perfoliatum flowering top,	
Levocetirizine	1	gelsemium sempervirens root,	
Levorphanol tartrate	1	strychnose nux-vomica seed,	
Lidocaine and prilocaine cream	1	phytolacca americana root,	
L-methylfolate	1	pulsatilla vulgaris	
Lopinavir and ritonavir	1	and dichromate ion	1
Loratadine and pseudoephedrine	1	Otic solution	1
Losartan potassium and hydrochlorothiazide	1	Oxaprozin	1
Magnesium oxide	1	Oxazepam	1
Menthol	1	Pancrelipase	1
Metformin and saxagliptin	1	Paracetamol	1
Methotrexate sodium	1	Paroxetine	1
Methyldopa	1	Pentosan polysulfate sodium	1
Metolazone	1	Permethrin	1
Metoprolol succinate	1	Phenylephedrine	1
Metronidazole flagyl	1	Pilocarpine	1
Midodrine	1	Pitavastatin	1
Monistat	1	Placebo lactose	1
Mycophenolate mofetil	1	Povidone and iodine	1
Naphazoline	1	Prasugrel	1
Nebivolol	1	Premarin	1
Neomycin	1	Pulsatilla and sulphur	1
Neomycin sulfate, polymyxin B sulfate and hydrocortisone	1	Pyridoxine	1
Nicotine	1	Quetiapine fumarate	1
Nifedipine	1	Ranolazine	1
Nizatidine	1	Rasagiline	1
Norinyl 1 50	1	Rifampin	1
Noscapine	1	Rizatriptan	1
		Rofecoxib	1
		Roflumilast	1

Individual Medication/Active Ingredient	# items
Ropinirole	1
Rosiglitazone	1
Saccharomyces boulardii lyo	1
Salicylic acid	1
Saxagliptin and metformin	1
Silodosin	1
Silver sulfadiazine	1
Sorafenib	1
Sotalol	1
Sumatriptan	1
Sumatriptan succinate	1
Terbinafine	1
Terconazole	1
Theophylline	1
Tiagabine	1
Ticagrelor	1
Tiotropium	1
Tolnaftate	1
Tolterodine	1
Tolterodine tartrate	1
Torsemide	1
Travoprost	1
Triamcinolone	1
Triazolam	1
Trospium chloride	1
Tucks hemorrhoidal	1
Valdecoxib	1
Valproic acid	1
Varixina	1
White petrolatum	1
Zaleplon	1
Zelenin drops	1
Ziprasidone	1
Zolmitriptan	1

Appendix C. Complete List of Medications Returned by Brand or Proprietary Name

	Items	% of total
Total items identified as pharmaceutical products	3028	
Total items unidentifiable by brand or proprietary name	477	15.8%
Total items identified as generic or by brand or proprietary name	2551	84.2%
Total different brand or proprietary names identified	551	
Generic drug items	1367	53.6%
Brand or proprietary name items	1184	46.4%

Brand or Proprietary Name	# items	Brand or Proprietary Name	# items
Renvela	70	Chloraseptic	6
Testim 1%	65	Lyrca	6
Levemir Flexpen	26	Depakote ER	5
Androgel	25	EpiPen Jr Auto Injection	5
PeriGuard Antimicrobial Protectant		Mucinex	5
Barrier Cream	25	Advil Liqui-Gels	5
Pulmicort Respules	15	Vigamox	5
Lipitor	12	Airborne Powder 3.5g	5
Synthroid	12	Nitrostat	5
Tylenol Extra Strength	11	Klor-Con	5
Kaopectate	10	Serevent	5
Airborne Formula	10	Diovan	5
Airborne	10	Xanax XR	4
Seroquel	10	Abilify	4
Welchol Colesevelam 3.75g	9	Neosporin	4
Hadol	9	Celebrex	4
NovoLog	8	Zyrtec	4
Trialex	8	Sensipar	4
Adderall XR	7	Theraflu	4
Cymbalta	7	Benadryl Allergy	4
Advil	7	Aricept	4
Aleve	7	Neurontin	4
Retin-A Micro	7	Safeway Hydrocortisone	
Ambien	7	Plus 12 Moisturizers	4
Cheratussin AC Syrup	6	Lantus	4
Nexium	6	Levoxyl	4
Singulair	6	Savella	4

Brand or Proprietary Name	# items	Brand or Proprietary Name	# items
Zyprexa	4	Nyquil Cold and Flu	2
Protonix	4	Tylenol PM	2
Crestor	4	Vicodin	2
Kinginseng Royal Jelly	4	Vicodin ES	2
Micardis	4	Zicam Allergy Relief	2
Bisac-Evac	4	Children's Robitussin	2
Q-Pap Extra Strength	3	Robitussin	2
Tylenol Arthritis Pain	3	Children's Tylenol Plus	2
Tylenol PM Extra Strength	3	Endocet	2
Bayer Aspirin	3	Combivent	2
QVAR Inhalation Aerosol	3	Proventil HFA	2
Dimetapp Cold and Cough	3	Azor	2
Zostrix Capsaicin .025% Genderm	3	Aspir-Low	2
Theraflu Cold and Sore Throat	3	Double Antibiotic Ointment	2
Multaq	3	Biscolax Laxative Suppositories	2
Ca-Rezz Incontinent Care	3	Pepto Bismol	2
Advair Diskus	3	Alphagan P	2
Fenesin IR	3	Entocort EC	2
Novolin N	3	Buproban	2
Benicar	3	Wellbutrin XL	2
Avalide	3	Caltrate 600+D	2
Hyzaar	3	Tazicef	2
Motrin IB	3	Biaxin	2
Levothroid	3	Plavix	2
Imodium AD	3	Colcrys	2
Cozaar	3	Welchol	2
Amitiza	3	Cenestin	2
Toprol-XL	3	Premarin	2
Asmanex	3	Clarinx	2
Niaspan	3	Dexilant	2
Slo-Niacin	3	Voltaren	2
Tamiflu	3	Benadryl Allergy Ultratab	2
Evista	3	Qdryl Allergy	2
Januvia	3	Comtan	2
Restoril	3	EpiPen	2
Spiriva Handihaler	3	Lexapro	2
Waltussin	3	Estrace	2
Q-Pap	2	Delestrogen	2
Tylenol	2	Levora	2
Tylenol 8-Hour	2	Zetia	2

Brand or Proprietary Name	# items	Brand or Proprietary Name	# items
Vytorin	2	Detrol	2
Nasarel	2	Nasacort AQ	2
Prozac	2	Qing Kai Ling Koufuye	2
Advair 250/50	2	Xue Fu Zhu Wan Supplement	2
Veramyst	2	Effexor XR	2
Flovent HFA	2	Viibryd	2
Mucinex DM Maximum Strength	2	Centrum	2
INTUNIV	2	Calmoseptine	2
Novolin R	2	Tylenol Cold Head	2
Pramosone	2	Ventolin HFA	2
Xolegel	2	Ziagen	1
Lamictal	2	Children's Triaminic	1
Prevacid	2	Little Fevers Fever	1
Xopenex HFA	2	Pain Relief	1
Lidoderm	2	Tapsin Caliente Noche	1
Linzess	2	Acephen	1
Claritin D	2	LiquiCaps	1
Ativan	2	Rapid Release Pain Reliever	1
Namenda	2	Tylenol Extra Strength	1
Pentasa	2	Tylenol 500MG	1
Kombiglyze XR	2	Tylenol Arthritis	1
Nasonex	2	Tylenol Children's Meltaway	1
Rena-Vite RX	2	Tylenol Extra Strength	
Sular	2	Rapid Release	1
NitroQuick	2	Tylenol Flu	1
Zegerid OTC	2	Tylenol Regular Strength	1
Oxycontin	2	Tylenol 8-Hour Caplet	1
Iliadin	2	Multi-Symptom Nighttime	1
Opana ER	2	DayQuil	1
Actos	2	Backaid Maximum Strength	1
Mirapex	2	Tylenol Sinus Severe	1
Preperation H Cream	2	Menstrual Relie	1
Sudafed	2	Robitussin Cough and Cold	1
Seroquel XR	2	Robitussin To Go	1
Xifaxan	2	Daytime	1
Actonel	2	Delsym	1
Exelon	2	NyQuil	1
Senna	2	Sudafed Sinus Nighttime	1
Ocean Saline Nasal Spray	2	Vicks NyQuil Sinus	1
Vesicare	2	Allergy Multi-Symptom	1

Brand or Proprietary Name	# items	Brand or Proprietary Name	# items
Alka Seltzer Plus	1	Cepacol Sore Throat and Cough Mixed Berry	1
Comtrex	1	Lanacane Antibacterial Spray	1
Excedrin PM	1	Acne Medication 10	1
Sudafed PE Severe Cold	1	Align Probiotics	1
Pamprin Multisymptom Menstrual Pain Relief	1	Pepto Bismol Caplets	1
Ultracet	1	Azopt	1
Menova Cream	1	Bromday	1
Mylanta DS Fast Acting	1	Pulmicort Flexhaler	1
PROAIR HFA	1	Symbicort Budesonide 160mcg	1
Ventolin	1	Rhinocort Aqua Budenonide	1
Binosto	1	Budeprion XL	1
Fosamax	1	Vivarin Alertness Aid	1
Fosamax Plus D	1	Caladryl	1
Valturna	1	Calsium 500+D	1
Tekamlo	1	Tums	1
Tekturna HCT	1	Tums Ultra Strength	1
Prinox	1	Pepcid Complete	1
Gaviscon Extra Strength	1	Calcium Citrate	1
Endep	1	Citracal	1
Norvasc	1	Actical	1
Exforge HCT	1	Caltrate	1
Trimox	1	Zostrix Cream	1
Bioclote	1	Salonpas	1
Aspirin Delayed Release	1	Debrox Drops Earwax Removal	1
Ecotrin	1	Velosef	1
Malarone	1	Aller-Tec	1
Augmentin 875mg	1	Evoxac	1
Azelex	1	Wal-Finate D	1
Zithromax	1	Deconamine SR	1
Baneocin	1	Suclor	1
Topocin	1	Enfamil Poly-Vi-Sol Supplement	1
Bacitracin Plus	1	D3-50	1
Double Antibiotic	1	Cosamin DS	1
Triple Strength Antibiotic	1	Move Free Glucosamine Chondroitin	1
Tripleflex	1	Triple Flex Supplement	1
Walgreens Triple Antibiotics	1	Omnaris	1
Walsporin First Aid		Cipro	1
Antibiotic Ointment	1	Celexa	1
Beconase Inhalation Aerosol	1	Tavist-D	1
Bellamine S	1	Cloderm	1

Brand or Proprietary Name	# items	Brand or Proprietary Name	# items
Mycelex 1%	1	No-Spa	1
Desenex	1	Avodart	1
Premphase	1	Balneol Hygenic Cleansing Lotion	1
Prempro	1	Ca-Rezz Antibacterial Skin Care	1
Aarane N	1	Truvada	1
Intal Inhaler	1	Pce Dispertab	1
Ulex Lotion 10% Crothamitron	1	Evamist	1
Pradaxa	1	Vivelle Dot	1
Ddvp	1	Premarin Vaginal	1
Apri	1	Estinyl	1
Tridesilon Desonide Creme	1	Tri-Sprintect Birth Control	1
Pristiq	1	Oil of Eve Primrose	1
Kapidex	1	Pepcid AC	1
Focalin XR	1	Pepcid AC Chewable	1
Q Tussin DM	1	Uloric	1
Up and Up Adult Cough Formula DM Max	1	Plendil	1
Alka Seltzer Plus Mucus and Cough Liquid Gels	1	Tricor	1
Non-Drowsy Formula Waltussin	1	Duragesic	1
Robitussin Lingering Cold Long-Acting Cough gels	1	Slowfe 160mg Ferrous Sulfate	1
Emetrol for Nausea	1	Allegra	1
Flector Patch	1	Allegra-D	1
Diclofenac Sodium	1	Diflucan	1
Olfen Gel	1	Larinden A Ointment	1
Cartia XT	1	Larinden C Ointment	1
Dramamine	1	Aerobid	1
Sominex	1	Stannous Fluoride	1
Benadryl Itch Stopping Cream	1	Oral-B NeutraCare Mint	1
Benadryl Spray	1	Flonase	1
Depakote ER	1	Advair Discus 500/50	1
Abreva Cream	1	Advair HFA	1
Colace	1	Nature Made Folic Acid	1
DSS	1	Frova	1
Doc-Q-Lace	1	Fucibet Cream	1
Docusate Sodium	1	Fucidin Antibiotic Cream	1
Dulcolax Laxative	1	Horizant	1
Stool Softener	1	Nature Made Garlic	1
Anzemet	1	Zymar	1
Unisom Sleepmelts	1	QTussin	1
		Mucus Relief	1
		Waltussin Cough DM	1

Brand or Proprietary Name	# items	Brand or Proprietary Name	# items
Mucinex DM	1	L-Lysine	1
Liquibid PD-R	1	Bonine	1
Phenavent LA Extended-Release	1	Medical Cannabis	1
Mucinex D	1	Kiva	1
Nerviosil	1	ActivOn Topical Arthritis	1
Novolin 70/30	1	Canasa	1
Micardis HCT	1	Actoplus Met XR	2
Benicar HCT	1	Mentholatum Ointment	1
Diovan HCT	1	Wintergreen Oil	1
Cortizone 10	1	Methylin ER	1
Procto-Kit	1	Ritalin LA	1
Scalphen Mesculphen 330mg	1	Minoxidil Topical Solution	1
Dilaudid	1	Minoxidil Tabs	1
Children's Motrin	1	Monistat External Vulvar Cream	1
Infant's Ibuprofen	1	MS Contin	1
Good Sense Ibuprofen	1	B-100 Energy Complex	1
Up and Up Ibuprofen	1	Centrum Silver	1
Prozinc Protamine Zinc Recombinant		Century Senior	1
Human Insulin	1	Complete Multi Formula for Women	1
NovoLog Mix 70/30		Daily Vite	1
Humalog KwikPen	1	Multi For Her	1
Fiber Choice Supplements	1	Multivitamin Performance	1
Atrovent	1	Men's One A Day	1
Remedy with Olivamine		One A Day Womens Formula Oral	1
Nutrasheild with Silicone Blend	1	Renal Caps	1
Avapro	1	Vitafusion	1
Stromectol	1	Women's One A Day	1
Ketorolac Tromethamine	1	Zycoze	1
Alaway	1	Flinstones with Iron	1
Lactaid	1	Surbex-750 with Iron	1
Enulose	1	Trinatal RX 1	1
Fosrenol	1	Bactroban	1
XYZSL Lecvocetrizine Dihydrochloride	1	Bystolic	1
Levaquin	1	Nifedipine ER	1
Lipoderm Patch	1	Macrobid	1
Deplin	1	Algas Metal Detox	1
Loperamide Hydrochloride	1	Pro-Stat Sugar Free Supplement	1
Kaletra	1	Qderyl Antacid	1
Claritin-D	1	Quetzal Detox Support	1
Lovastatin	1	Po Chai Pills Herbal Supplement	1

Brand or Proprietary Name	# items	Brand or Proprietary Name	# items
Procera AVH Cognitive Enhancer	1	Zantac	1
Wellness Fizz	1	Zantac 150	1
Xue Fu Zhu Yu Wen Herbal Supplement	1	Ranexa	1
365 Everyday Value Be Well Cough Ease	1	Azilect	1
Zyprexa Zydis 15mg	1	Maxalt-MLT	1
Zyprexa Zydus 5mg	1	Vioxx	1
Fish Oil Concentrate	1	Daliresp	1
Nature's Bounty Fish Oil	1	Avandia	1
Omega-3	1	Florastor	1
Zofran	1	Wart Off	1
Coldcalm	1	Transderm Scop	1
Acertic Acid	1	Sennagen	1
Daypro	1	Senna-Lax	1
Oxecta	1	Renagel	1
Afrin Nasal Spray	1	Revatio	1
Afrin Original	1	Viagra	1
Anefrin Nasal Spray	1	Rapaflo	1
Zicam	1	SSD Cream	1
Zenpep	1	Little Tummys Gripe Water	1
Solpadeine Capsules	1	Senexon	1
Penicillin V Potassium	1	Gas X Prevention	1
Elmiron	1	Gas-X Extra Strength	1
Elimite	1	Phazyme	1
Uristat	1	Zocor	1
Livalo	1	Nexavar	1
Equaline Clearlax	1	Carafate	1
Miralax Polyethylene 3350	1	Klaron	1
Smooth Lax	1	Imitrex Nasal Spray	1
MoviPrep	1	Hytrin	1
Betadine Solution	1	Gabitril	1
Preperation H Cooling Gel	1	Brilinta	1
Effient	1	Spiriva	1
Prednesol Tablets	1	Spiriva Handihaler	1
Compro	1	Tinactin Antifungal Cream	1
Prometrium	1	Sensi-Care Protective Barrier	1
Sudafed 12-Hour		Travatan Z	1
Pseudoephedrine HCL 120mg	1	Renova	1
Suphedrine	1	Azmacort	1
Heel Inc Cold	1	Tucks Hemorrhoidal Ointment	1
Accupril	1	Huoxiang	1

Brand or Proprietary Name	# items
Lomaherpan	1
Mucovit Crema	1
NNitro-Tech Hardcore	1
Oral Demulcent Sore Throat Syrup	1
Sanshedan Chuanbei Ye	1
Throat ND Gland	1
Topsym Polivalente Crema	1
Gas Defense Formula	1
Hepa-Plex Tablets	1
Ocuvite Eye Mineral and Vitamin	1
Therms M	1
Vessel Care	1
Valtrex	1
Bextra	1
Varixina Cream	1
Viiibryd Vilazodone HCL Tablets	1
Dialyvite 800 with Zinc 15	1
One A Day Vitamin	1
One Daily For Men	1
Z-Guard Skin Protectant Paste	1
Sonata	1
Zelenin Drops	1
Geodon	1
Zomig-Zmt	1
Edluar	1
Intermezzo	1

Appendix D. Complete List of Medications Returned by Manufacturer or Distributor

	Items	% of total
Total items identified as pharmaceutical products	3028	
Total items unidentifiable by manufacturer or distributor	535	17.7%
Total items identified by manufacturer or distributor	2493	82.3%
Total number of manufacturers or distributors identified	274	

Manufacturer	# items	Manufacturer	# items
Teva	194	E. Fougera	25
Mylan	104	Mallinckrodt	25
Watson	85	Ranbaxy	23
Genzyme	71	Apotex	22
Sandoz	68	Sanofi-Aventis	22
Pfizer	66	West-Ward	22
Auxilium	65	Upsher-Smith	21
Eon	63	Ameri	20
McNeil	58	Forest	20
Abbott	56	Bausch & Lomb	19
Qualitest	56	Eli Lilly	19
AstraZeneca	48	Major	19
GlaxoSmithKline	48	Bayer	18
Actavis	45	Dr. Reddy's	18
Novo Nordisk	41	Boehringer Ingelheim	7
Amneal	38	Aurobindo	16
Novartis	36	Hospira	16
Merck	35	Daiichi Sankyo	14
Greenstone	34	Falcon	14
Taro	32	LNK International	13
Walgreen	32	Zydus	13
Wyeth-Ayerst	29	Baxter	12
Lupin	27	Ortho McNeil	12
Glenmark	26	Schering-Plough	12
Perrigo	26	Par	11
Roxane	26	Pliva	11
Airborne	25	Reckitt Benckiser	11
DermaRite	25	Breckenridge	10

Manufacturer	# items	Manufacturer	# items
Paddock	10	Eisai	4
Shire	10	Excellium	4
Takeda	10	FNC Medical	4
Bristol-Myers Squibb	9	GenDerm	4
Endo	9	Interpharm	4
Kremers Urban	9	Johnson and Johnson	4
Silarx	9	Morton Grove	4
Vintage	9	Pharma Medica	4
Wockhardt	9	Sankyo	4
Alcon	8	Time Cap	4
Ethex	8	UDL	4
Hi-Tech	8	Warner Chilcott	4
Ivax	8	ATE Nutritionals	3
Kendall	8	Cadista	3
Procter & Gamble	8	Camber	3
G&W	7	Cardinal Health	3
Lannett	7	CVS	3
Nature Made	7	Cypress	3
Purdue	7	Dava	3
Rugby	7	Goldline	3
Allergan	6	Heritage	3
Caraco	6	KVK-Tech	3
Kaiser	6	Meda	3
URL	6	Mei Sun Hung	3
Akyma	5	Nature's Bounty	3
Cobalt	5	Pacific	3
Costco	5	Parke-Davis	3
Dey	5	Pharbest	3
Dynarex	5	Pharmaceutical Associates	3
Elkins-Sinn	5	Roche	3
Global	5	Salix	3
King	5	Sun	3
Purepac	5	Sunovion	3
Trader Joe's	5	Swiss Caps	3
AbbVie	4	A. G. Marin	2
Akorn	4	Alpharma	2
Amgen	4	Amide	2
Barr	4	Bristol Primary Care Product	2
Blu	4	Calmoseptine	2
Centrum	4	Chattem	2

Manufacturer	# items	Manufacturer	# items
Contract Pharmacal	2	Ascend	1
Danbury	2	Astellas	1
Dista Products	2	Avsa	1
Ferndale	2	AXCAN Scandipharm	1
Fleming	2	Balkan	1
Geri-Care	2	BHI/Heel	1
Gilead Sciences	2	Biocalth	1
Hetero Drugs	2	Biocodex	1
InvaGen	2	Boca Pharmacal	1
JHP	2	Boiron	1
Johnson and Johnson/Merck Consumer	2	Capellon	1
LEO	2	Carolina Medical Products	1
McKesson	2	CBD Science	1
Med Tech	2	Cephalon	1
MSD Consumer Care	2	Chain Drug Marketing	1
National Vitamin	2	Combe	1
Nostrum	2	Convatec	1
Phoenix	2	Coria	1
Prometheus	2	Dexcel	1
Rising	2	Eurand	1
Sidmak	2	Family Dollar	1
Stiefel	2	G.D. Searle	1
Supervalu	2	Genentech	1
TAP	2	Gercl	1
Target	2	Glaxo Wellcome	1
Unichem	2	Grupo Farmaceutico	1
Vicks	2	Grumenthal	1
Warrick	2	Guangzhou	1
Xttrium	2	Guangzhou Baiyunshan Mingxing	1
Zicam	2	Hainan Sanye	1
3M ESPE Dental	1	Hersil S.A.	1
Accord Healthcare	1	Hillestad	1
Alaven	1	Hisamitsu	1
Align GI	1	Ilex Consumer Products	1
Altana	1	Ista	1
Andromaco	1	Janssen	1
Alza	1	Kenwood	1
America Medic	1	KGS	1
Apothecon	1	Kiva	1
AR Scientific	1	Kos	1

Manufacturer	# items	Manufacturer	# items
Kroger	1	Sparc	1
L Perrigo	1	Spirit	1
Lek	1	Stada	1
Marlex	1	Stat Rx	1
Matrixx Initiatives	1	Taiji	1
Maven	1	Teikoku	1
Mentholatum	1	Ther-Rx	1
Metagenics	1	Trigen	1
Miralus Healthcare	1	United Research/ Mutual	1
Mission Pharmacal	1	Upstate	1
Mutual	1	VK	1
Nephron	1	WellSpring	1
Nordic Nature	1	WFM Private Label	1
Northstar	1	Whole Foods Market	1
Northwest Natural	1	Winthrop	1
Nutramax	1	Wirktoff	1
NutraMedix	1	Xanodyne	1
Nutrition USA	1	Zylera	1
Ohm	1		
One A Day	1		
Oral-B	1		
OTC	1		
Pack	1		
Pamlab	1		
Physicians Total Care	1		
Prasco	1		
Prince of Peace	1		
Rimafar	1		
Rite Aid	1		
Robinson	1		
Roerig	1		
Schein-Danbury	1		
Schiff	1		
Sciele	1		
Searle	1		
Sherfarma S.A.C.	1		
Sinphar	1		
Solco Healthcare	1		
Solvay	1		
Source Naturals	1		

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TELEOSIS INSTITUTE

863 Arlington Avenue

Berkeley, CA 94707

510.558.7285 Fax 510.527.1682

www.teleosis.org