

Medication Abuse, Preventable Poisonings and Pharmaceutical Pollution - Research Summary

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I. Medicine Sales Amounts

There's no single publicly available source for complete information on the numbers of prescription and over-the-counter medicines sold, nor on the pharmaceutical companies' revenue related to the sales, so the presentation here represents an extrapolation from available data state and national level data. This is a simplified method of estimation, for illustration purposes only. Medication prescribing and consumption patterns differ in different localities, so this extrapolation is just a general snapshot of what may be true for Kitsap County.

Table 1

| Extrapolated Medicine Sales in Kitsap County, 2015 | Sales in Dollars | Sales in Units |
|---|-------------------------|-----------------------|
| Prescription Medicines ¹ | \$183,130,973 | 3,397,941 |
| Over-the-Counter Medicines ² | \$ 25,784,495 | 4,658,881 |
| Total | \$208,915,468 | 8,056,822 |

¹ Based on retail pharmacy sales in WA State in 2015. Does not include mail-order prescriptions which represent about 11% of total prescriptions dispensed in the U.S. *Source: Kaiser Family Foundation*

² Based on sales at all outlets in U.S. in 2015. *Source: Consumer Healthcare Products Association*
(<http://www.chpa.org/MarketStats.aspx>)

Source information and calculations used for Table 1:

Total Number of Retail Prescription Drugs Filled at Pharmacies – 2015

Washington State: 92,928,952 prescriptions, totaling \$5,008,376,790

This total excludes prescriptions filled by mail order, and captures only some of repackaging sales.

Source: Kaiser Family Foundation. <http://kff.org/other/state-indicator/total-retail-rx-drugs/>, accessed 8/23/16.

In 2015, Kitsap County's population (est. 258,200) was 3.66% of WA State population (est. 7,061,410).
Source: Office of Financial Management, www.ofm.wa.gov, accessed 8/26/16
Extrapolating per capita: there may have been approximately **3,397,941 prescriptions filled in Kitsap pharmacies in 2015 for \$183,306,591.**

Total Over-the-Counter Medicine Sales – 2015

United States: 5,800,000,000 units of OTC medications sold (i.e. 5,800 million), totaling: \$32.1 Billion
Source: CHPA (Consumer Healthcare Products Association) website citation of The Nielsen Company data for OTC Sales for 2014, in all U.S. outlets (food, drug, mass, select club and dollar store retailers, convenience, and military stores). <http://www.chpa.org/OTCRetailSales.aspx> and <http://www.chpa.org/SalesVolume.aspx> accessed 8/23/16.

In 2015, Kitsap County's population (258,200) was 0.08% of total U.S. population (321,442,019).
Source: www.census.gov, accessed 8/26/16
Extrapolating per capita: there may have been approximately **4,658,881 units of over-the-counter medicines sold in Kitsap County in 2015 for \$25,784,495.**

II. Unused Medicines

About one-third of medicines sold to households go unused.

This is an estimate based on results from a number of studies with different methodologies that estimate or measure medicines that do not get used.

Reasons for leftover medicines include:

- Prescribing more medications than the patient needs.
- Over-purchasing of over-the-counter medicines by consumers.
- Patient doesn't finish a course of medications.
- Medicines are "used as needed" for a symptom and expire before used or are no longer needed.
- Changes in medications: Patient cannot tolerate a medicine or medicine is not effective. Prescriber changes treatment plan.
- Serious Illness or Health Event: Lots of medicines needed. Patient recovers, but some medicines are not used.
- End-of-Life: Lots of medicines, including strong pain relievers are often needed. Patient dies with some medicines leftover.

1. One recent survey of 238 residents in California found that 2 out of 3 prescription medicines were reported unused. Reasons included: disease/condition improved (40.4%), forgetfulness (10.6%), and side effects (8.0%).

Source: Law et al. "Taking stock of medication wastage: Unused medications in US household". 2015. *Research in Social and Administrative Pharmacy* 11; 571-578.
<http://www.sciencedirect.com/science/article/pii/S1551741114003337>

2. Example of medication changes: Only about 50% of patients respond to a first trial of antidepressant medication, therefore, a large majority of patients require multiple trials of medication prior to achieving remission of depression symptoms. On average, patients receiving medication for the treatment of depression require five different trials before symptoms remit.

Source: Washington State Psychological Association, 2009

3. A small survey of individuals returning unwanted medicines to Alameda County, California's medication drop box program found:
 - a. 56% were returning their own medicines
 - b. 44% were returning medicines for more than just themselves (others in household)
 - c. 23% were returning drugs for a deceased person

NOTE: Data was collected using a voluntary written survey on location set in a visibly convenient place on the take-back bin at nine of the 31 sites. Sixty-two responses were collected in a three-month period.

III. Prescription Medicine Abuse and Poisonings

Overdoses are the number one cause of unintentional injury deaths in Kitsap County.

In 2014, 41% of these overdose deaths involved opiate prescription drugs or heroin.

Source: Washington State Vital Statistics database, described in May 2015 data report by Siri Kushner, Epidemiologist for Kitsap Public Health District (KPHD)

- a. During the five year period 2011-2015, Kitsap County had about 100 unintentional injury deaths each year on average. Of those, 23% were due to overdose poisonings, about 23 deaths per year.
- b. Until 2011, the majority of opiate-associated deaths in Kitsap were due to prescription opioids, however on average during 2011-2013, they comprised only 41%. During that 3-year period, there were 18 deaths related to heroin and 1 death related to fentanyl.
- c. Results from the 2015 Washington State Drug Injector Health Survey show that among those who used heroin in the last three months, 57% reported they were "hooked on" prescription-type opiates before they began injecting heroin. In Kitsap, this was reported by 67%, although the sample size is very small, calling the statistical validity of this proportion into question.

Source: 2015 Washington State Drug Injector Health Survey, adai.typepad.com/adai_news/2016/02/adai-reports-on-syringe-exchange-and-drug-injector-health.html. Local data is from communication with Susan Kingston, Alcohol and Drug Abuse Institute, University of Washington.

Many teens think prescription medicines are safer to abuse than street drugs.

Source: Partnership for Drug-Free America. 2012 Partnership Attitude Tracking Study <http://www.drugfree.org/newsroom/pats-2013-full-report-key-findings>

- a. 73% of teens say it's easy to get prescription drugs from parents' medicine cabinets.

Source: Partnership for Drug-Free America. 2012 Partnership Attitude Tracking Study <http://www.drugfree.org/newsroom/pats-2013-full-report-key-findings>

- b. In Kitsap County in 2014, one out of twenty 10th and 12th graders, equating to over 300 youth, reported using a pain killer to get high in the past 30 days. Nearly 500 10th and 12th graders, about 1 in 12, reported using a prescription drug prescribed to someone else at least once in the past 30 days.

Source: 2014 Healthy Youth Survey, described in October 1, 2016 data report by Siri Kushner, Kitsap Public Health District

Poisonings and ER visits are common from household medicines, especially among kids and seniors. Many studies support this statement.

- a. In 2015, there were 499 calls to the Washington Poison Center (WPC) regarding accidental poisoning of children aged 6 years and under by prescription and over the counter medications. These comprised half of all calls to the WPC for this age group.

Source: Data provided by Dr. Alexander Garrard, Director of the WPC, in a communication on 9/9/16.

- b. About 165 young kids — or roughly four school busloads of children — are seen in emergency rooms every day in the US after getting into medications (both over-the-counter and prescription).

Sources:

Centers for Disease Control and Prevention. Put Your Medicines Up and Away and Out of Sight. CDC Website. Available from: <http://www.cdc.gov/features/medicationstorage/>. Accessed February 9, 2012.

Washington Poison Center (2014). Top Ten of 2014. Available online at: <http://www.wapc.org/2014-top-ten/>

- c. In 2009 national data, 71,224 emergency department visits are made annually for medication overdoses by children under age 18; 82% involved children under age 5. 34% of these ER visits involved commonly available over-the-counter medications. Acetaminophen, cold and cough products, NSAIDs and antihistamines were the most frequently reported.

Source: Schillie, S.F., et al. 2009. Medication overdoses leading to emergency department visits among children. Am J Prev Med 2009. Available online at: http://www.ajpm-online.net/webfiles/images/journals/amepre/AMEPRE_2545.pdf

- d. 26% of child poisoning deaths in Washington were caused by someone else's over-the-counter medications and 32% were caused by someone else's prescription medications. 2004 data.

Sources:

Sabel, J. (2004). Washington State Childhood Injury Report – Poisoning Chapter. WA DOH. Available online at: http://www.doh.wa.gov/hsqa/emstrauma/injury/pubs/wscir/WSCIR_Poisoning.pdf

Washington State Department of Health. (2013). "Poisoning and drug overdose." Washington State Injury and Violence Prevention Guide. Available online at: <http://www.doh.wa.gov/Portals/1/Documents/2900/InjuryReportFinal.pdf>

From 1998-2015, Kitsap County's Child Death Review team evaluated 193 child deaths. In 12 cases, medications were noted to be involved—in four, the medications were felt to be causative, and in one the medication was felt to have contributed to the death.

Source: data provided by Tina Davis-Munn, KPHD, 9-22-16

IV. Abuse/Poisonings related to Over-the-Counter (known as OTC, or nonprescription) Medicines

OTC cough medicines, antihistamines, decongestants, and diet pills are often abused, especially by teenagers. See <https://www.drugabuse.gov/publications/drugfacts/cough-cold-medicine-abuse> and <http://abovetheinfluence.com/drugs/over-the-counter/>

Washington and about nine other states now ban the sale of OTC cough medicines containing dextromethorphan (a common OTC cough suppressant) to minors under age 18. The Washington law went into effect in July 2015.

Source: Consumer Healthcare Products Association, <http://www.chpa.org/dex.aspx>

Several OTC medicines (e.g., ibuprofen, Tylenol, and antihistamines) are among the top ten causes of poisonings in Washington homes, especially for children.

Source: WA Poison Center 2014 Top Ten List

- a. In Kitsap County in 2015, the top ten poisonings in children 6 years old and younger, resulting in calls to the WPC were for topical preparations (10%*); multiple vitamins (10%); "other" nonsteroidal anti-inflammatory drugs (8%); antacids (7%); antihistamines (7%); anthelmintics (7%); acetaminophen (6%); hormones and hormone antagonists (5%); melatonin (5%); and "botanical, energy and dietary supplements" not including melatonin (5%).

*percentages provided are the proportion of medication-associated calls related to the named medication.

Source: Data provided by Dr. Alexander Garrard, Director of the WPC, in a communication on 9/9/16.

- b. One study found that 34% of ER visits for children poisoned by medicines in the home were a result of OTC medicines.

Source: Schillie et al. "Medication overdoses leading to emergency department visits among children" 2009. *Am J Prev Med* 37: 181-187. <http://www.ncbi.nlm.nih.gov/pubmed/19666156>

- c. 26% of child poisoning deaths in Washington were caused by someone else's over-the-counter medications and 32% were caused by someone else's prescription medications.

Source: Sabel, J. (2004). *Washington State Childhood Injury Report – Poisoning Chapter*. WA DOH. Available online at: http://www.doh.wa.gov/hsqa/emstrauma/injury/pubs/wscir/WSCIR_Poisoning.pdf

The regulatory distinction between prescription and OTC drugs reflects whether the US Food and Drug Administration (FDA) deems the drug safe for self-medication when used as instructed, not whether the drug poses a risk of poisoning or abuse if accidentally or intentionally misused, and not whether the drug is safe in our environment.

V. Pharmaceutical Pollution

Pharmaceuticals are an emerging contaminant of concern in freshwater and marine water ecosystems, and in drinking water supplies.

See WA Ecology's webpage:

<http://www.ecy.wa.gov/programs/hwtr/pharmaceuticals/pages/pie.html>

Research is demonstrating harm to fish and other aquatic species from exposure to the low levels of pharmaceuticals commonly found in the environment. For an overview of some representative studies, see this 2011 background document:

http://www.takebackyourmeds.org/pdf_files/pharmaceuticals-in-environment

Pharmaceutical pollution comes from many sources, including:

- Human excretion
- Agricultural uses
- Manufacturing releases
- Improper disposal from healthcare facilities & businesses
- Improper disposal of residential waste medicines

A 2010 study by the US EPA and Washington State of Ecology concluded that the “2008 screening study detected pharmaceuticals and personal care products in every influent, effluent, and biosolids sample analyzed from five Pacific Northwest wastewater treatment plants.”

Source: Control of Toxic Chemicals in Puget Sound Phase 3: Pharmaceuticals and Personal Care Products in Municipal Wastewater and Their Removal by Nutrient Treatment Technologies, USEPA 2010 Pub. Number 10-03-004

Pharmaceuticals are commonly found in landfill leachate. See sampling results from the U.S.G.S. http://toxics.usgs.gov/highlights/2014-08-12-leachate_pharm.html

Pharmaceuticals are released by septic systems. A USGS study of Liberty Bay near Poulsbo, Washington, found a range of pharmaceuticals, personal care products, and pesticides in a sensitive estuary where there are no nearby point sources, such as wastewater treatment facilities. The study, designed to determine whether a coastal community served primarily by septic systems could release PPCPs, herbicides and plasticizers into their surface and groundwaters, was conducted where 70% of nearby residents use septic systems. Pharmaceutical compounds were detected that include Carbamazepine (anticonvulsant) , Gemfibrozil (lipid reduction), Ibuprofen (anti- inflammatory), Ketoprofen (anti-inflammatory), Propranolol (hypertension medication) and Trimethoprim (antibiotic)

Source: Dougherty, J.A., Swarzenski, P.W., Dinicola, R.S., and Reinhard, M. 2010. Occurrence of Herbicides and Pharmaceutical and Personal Care Products in Surface Water and Groundwater around Liberty Bay, Puget Sound, Washington. J. Environ. Qual. Vol. 39 No. 4, p. 1173-1180 Abstract online at: <https://www.agronomy.org/publications/jeq/abstracts/39/4/1173>, accessed 11/20/10.

Kitsap County Board of Health Ordinance 2010-1: Section 205(6)(d)(i)...”MRW shall not be deposited in the general municipal solid waste collection system, a public sewer, a storm drain, an onsite sewage system, in surface or ground water, or onto or under the surface of the ground.” Since most, if not all, pharmaceutical waste are moderate risk wastes (MRW), disposal of these wastes in the garbage or down the drain is specifically prohibited in Kitsap County.

Pharmaceuticals in Drinking Water

Levels of pharmaceutical compounds detected in drinking water are low, far below therapeutic doses, and potential health effects are not known. However, the presence of a mixture of drugs in some drinking water supplies suggests the need to reduce environmental contamination through safer disposal of waste medicines.

Source: JAMA review article: Traces of Drugs Found in Drinking Water: Health Effects Unknown, Safer Disposal Urged. Bridget M. Kuehn JAMA. 2008;299 (17):2011-2013 (doi:10.1001/jama.299.17.2011)

A 2008 Associated Press series published the results of a nationwide study that found medicines in the drinking water of 24 major metropolitan areas serving 41 million Americans. Some frequently detected compounds were atenolol (heart medication), carbamazepine (mood-stabilizer), gemfibrozil (anti-cholesterol), meprobamate (tranquilizer), naproxen (pain-killer), phenytoin (anti-seizure medication), sulfamethoxazole and trimethoprim (antibiotics).

- a. AP Investigation: Pharmaceuticals Found in Drinking Water. (2008) Web site with complete series of articles: http://hosted.ap.org/specials/interactives/pharmawater_site/
- b. "Top 11 compounds in US drinking water", New Scientist, January 12, 2009. Available online at: <http://www.newscientist.com/article/dn16397-top-11-compounds-in-us-drinking-water.ht>
- c. "AP Probe Finds Drugs in Drinking Water", Seattle Times, March 12, 2008. Available online at: http://seattletimes.nwsourc.com/html/nationworld/2004271213_appharmawateri.html, accessed 08/25/08.

Some drinking water supplies, such as Seattle's and Spokane's, have tested negative for pharmaceuticals because their water sources are from pristine watersheds. This result is expected for any water supply which is protected from human activities. Municipalities that use water sources downstream of wastewater treatment facilities are those which might detect pharmaceuticals.

- a. "Drugs found in more drinking water" Seattle Post-Intelligencer, September 12, 2008. Available online at: http://www.seattlepi.com/national/378874_pharmwater12.html, accessed 11/22/09.
- b. "No drug in Spokane water" Spokesman Review, August 21, 2008. Available online at: <http://www.spokesman.com/stories/2008/aug/21/no-drugs-in-spokane-water/>, accessed 11/22/09.