



Regional Center for Poison Control and Prevention

**Serving Massachusetts and
Rhode Island**

2018 ANNUAL REPORT

From the Director:

I am delighted to share with you the 2018 Annual Report for the Regional Center for Poison Control and Prevention serving Massachusetts and Rhode Island. This year has demonstrated our continued service to helping those who are exposed to poison and the healthcare professionals providing for these exposures.

Our services are confidential and we are focused on exceptional patient care and customer service. Although the number of exposure calls to the Center continues at a brisk pace, the number of follow-up calls made to the local hospitals has increased 8% over the last five years. Follow-up calls are calls made by the Poison Center staff to the local hospitals providing medical advice on complicated poisoning cases. The rise in follow-up calls indicates an increase in complex cases over the past five years. These complicated cases require more time, both in direct consultation and documentation in to our database.

To help ensure our staff is working with the most up-to-date technology, we have updated our toxicology database, to allow for documenting information faster and storing confidential information in a safer fashion. Additionally, we have downloaded a new data analysis package specifically designed for analyzing Poison Center data. This new package enables our staff to monitor poisonings and look at trends more closely, ultimately reshaping the way our annual report is laid out and expanding the data that we are able to share.

It is unknown who and when we will help next, but we do know that poisonings happen – and we are always committed and prepared to react appropriately. We are charged to meet the challenges of the year ahead as we grow stronger as an organization in our work to serve the public and healthcare professionals of Massachusetts and Rhode Island.

I hope you'll find our 2018 Annual Report useful, as a tool to better understand who we are, and what we are able to do for the people of our region.

Sincerely,

Michele M. Burns, MD, MPH

Medical Director

Services

The Regional Center for Poison Control and Prevention serving Massachusetts and Rhode Island first began in 1955 at Boston Children’s Hospital and is still situated there today. The Poison Center offers two main services: the Poison Help hotline and comprehensive education to the public and health care providers. Medical toxicologists from Boston Children’s Hospital, Beth Israel Deaconess Medical Center, Brigham and Women’s Hospital, and the Cambridge Health Alliance provide medical expertise to staff.

The Poison Help Hotline

The Poison Help Hotline is a phone service that provides medical advice to callers who have experienced a poison exposure or have a question about a poisoning. We are equipped to provide information on over 500,000 potentially toxic products. The hotline is operational 365 days a year, 24 hours a day and 7 days a week. Our service is free and completely confidential. We offer interpreter services in over 150 different languages to those who may need it. Our Center treats callers from Massachusetts and Rhode Island, but

the same number is available nationwide and can be used when experiencing a poisoning anywhere across the United States. Eighty percent of our calls are from the general public, while 20% of our calls come from Health Care Facilities looking for expertise on how to handle complicated poisoning exposures.

Cost-saving mechanism

Calling the Poison Center about an exposure can save unnecessary costs and trips to the Emergency Department. About 70% of all poisoning exposure calls to the Center can be treated at the site of exposure, while only 30% of all poisoning exposure calls require Emergency treatment. For every \$1 spent on Poison Center services, \$13 is saved in health care costs¹.

**For every \$1 spent on
poison services, \$13 is
saved in health care
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¹ The Lewin Group. Value of the Poison Center System. Final Report. Sept 26, 2012.

Comprehensive Education


General Public

Our Education Coordinator conducts outreach and educational sessions to raise awareness of the Poison Help hotline and poison prevention practices. Education sessions to the general public include audiences from schools, day cares, non-profits, support groups, councils on aging, or senior centers. Additionally, presentations are conducted to health care professionals, including social workers, emergency room physicians, school nurses, and home visiting nurses, to raise awareness of how the Poison Help hotline can be utilized within their occupations. The Education Coordinator continues to work to reduce both unintentional and intentional poisonings through prevention education and public awareness of the Poison Center's services.

Healthcare Providers

Our Center provides professional health education to a variety of health care professionals and students. The

Harvard Medical Toxicology Fellowship is our active two-year postgraduate fellowship in medical toxicology. In 2018, we had three fellows, one of which is a senior fellow completing his fellowship in June of 2019. Our Emergency Medicine Resident Rotation is comprised of residents from Boston Medical Center, Brigham and Women's Hospital, Massachusetts General Hospital, Beth Israel Deaconess Medical Center, as well as the Pediatric Emergency Medicine Fellows from Boston Children's Hospital, who participate in a one-month rotation at the center. These rotations include conferences, case-based rounds, lectures, relevant assigned readings, and discussions. In 2018 alone, our center had 51 rotator presentations given at the Poison Center. Additionally, Massachusetts College of Pharmacy and Health Sciences and multiple local teaching hospitals send senior Doctors of Pharmacy students and physicians-in-training to rotate through the center as well. The Poison Center staff continues to train professionals in toxicology, pharmacology, and emergency medicine to better care for poisoning exposures in the health care setting.



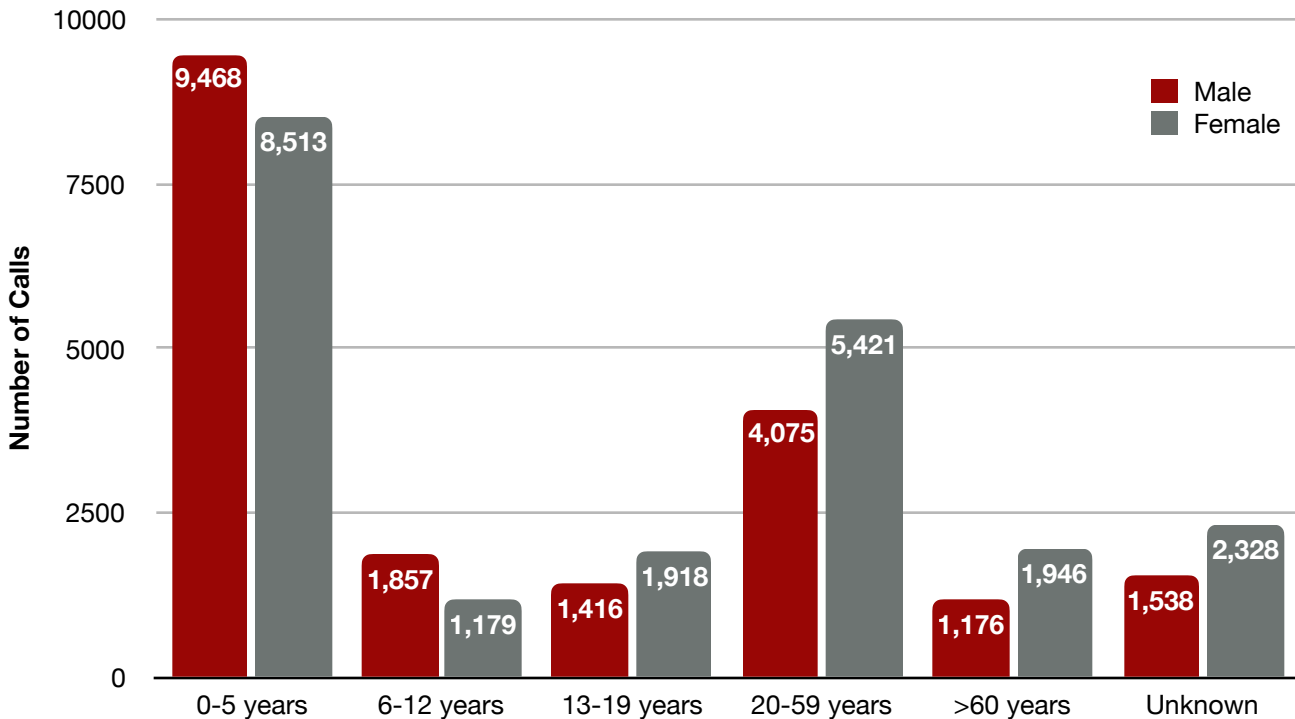
74% of exposure calls, in adults 60 years and over, were about medication errors

Who is poisoned in exposure calls?

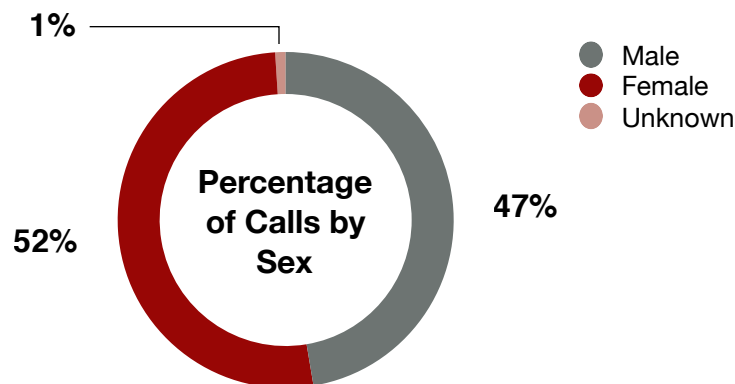
In 2018, the Poison Center received 45,979 total cases. Of those cases, 41,253 were for exposures and 4,726 were for information.

Exposure Cases by Age and Sex:

Exposure Calls by Age and Sex



The majority of our exposure calls to the Poison Center are for children 5 years and under (17,981 calls). Specifically, the greatest number of exposure cases by age involved one and two year olds, with 5,403 and 5,661 exposure cases, respectively. Most of the exposure cases at the center involved females (51.64%), while 47% affected males and 1.36% are unknown.

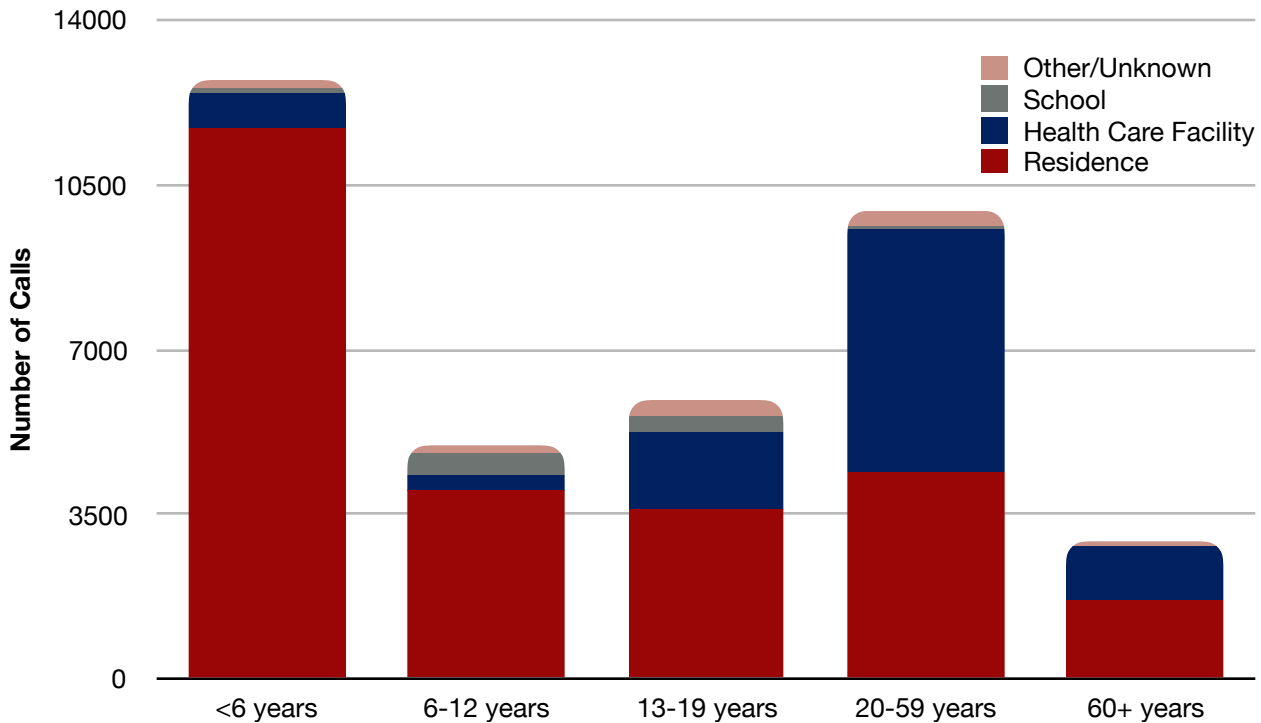


Where do people call from?

What's the difference between Caller Site and Exposure Site?

Caller site is the location from where people are calling. Exposure site is where people are exposed to a poison. These two sites may be different or the same depending on the circumstance. For example, a child may unintentionally take two doses of their medicine at home before going to school. When they get to school, the school nurse calls the Poison Center asking for advice. In this circumstance, the caller site is the school and the exposure site is a home residence.

Number of Calls by Age and Caller Site



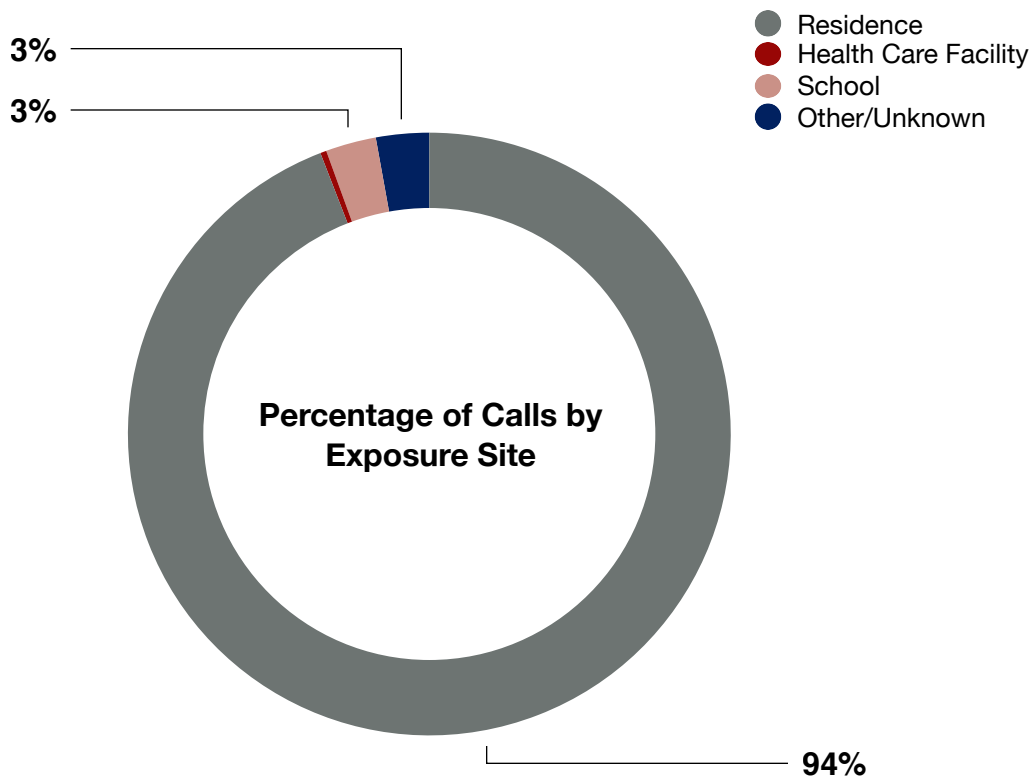
Caller Site by Age:

The majority of the cases received by the Poison Center for all age groups, except 20-59 year olds, came from a home residence. While, the majority of calls for the 20-59 year old age group came from a health care facility (5,171). In 2018, the Poison Center received a total of 1,065 calls from schools, with the 6-12 year olds accounting for the most number of calls from school (455). The highest number of workplace exposure calls came from the 20-59 year old age group with 48 cases. The remaining cases occurred in other locations such as restaurants/food service, public areas, and other/unknown locations.

Where do Poisonings occur?

Exposure Site:

Of the 41,253 exposure calls managed by the Poison Center, there were 38,820 exposures that took place in a home residence and 1,118 exposures took place in schools. The remaining 1,315 calls occurred in other locations including workplaces, restaurants/food service, public areas, and other/unknown.



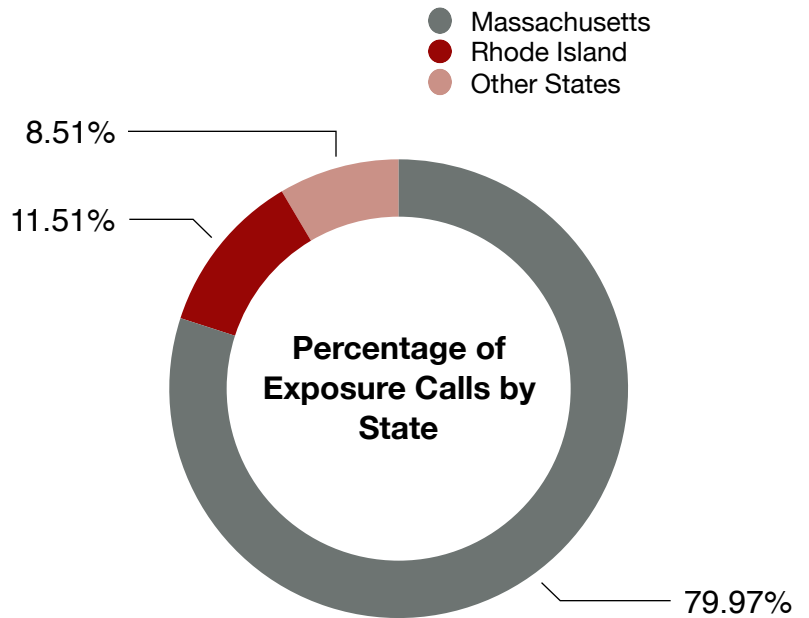
Where do Poisonings occur geographically?

Number of Exposure Calls by State:

The Poison Center managed 45,979 total calls, including 36,790 total calls from Massachusetts and 5,131 total calls from Rhode Island.

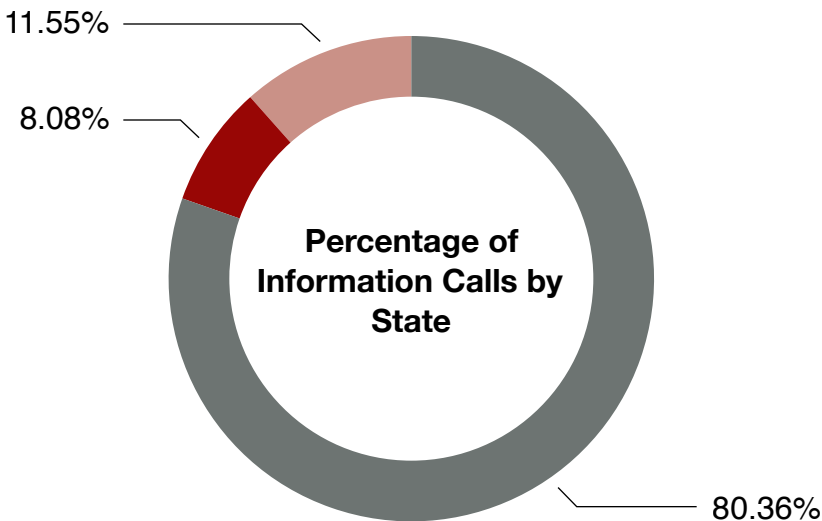
The remaining 4,058 calls were received from other states other than Massachusetts and Rhode Island.

Of the 36,790 total calls from Massachusetts, there were 32,992 exposure calls. Exposure calls from Massachusetts accounted for 79.97% of total exposure calls. Of the 5,131 total calls from Rhode Island, 4,749 were exposure calls. Rhode Island amounted to 11.51% of total exposure calls, while 8.51% of exposure calls came from other states.



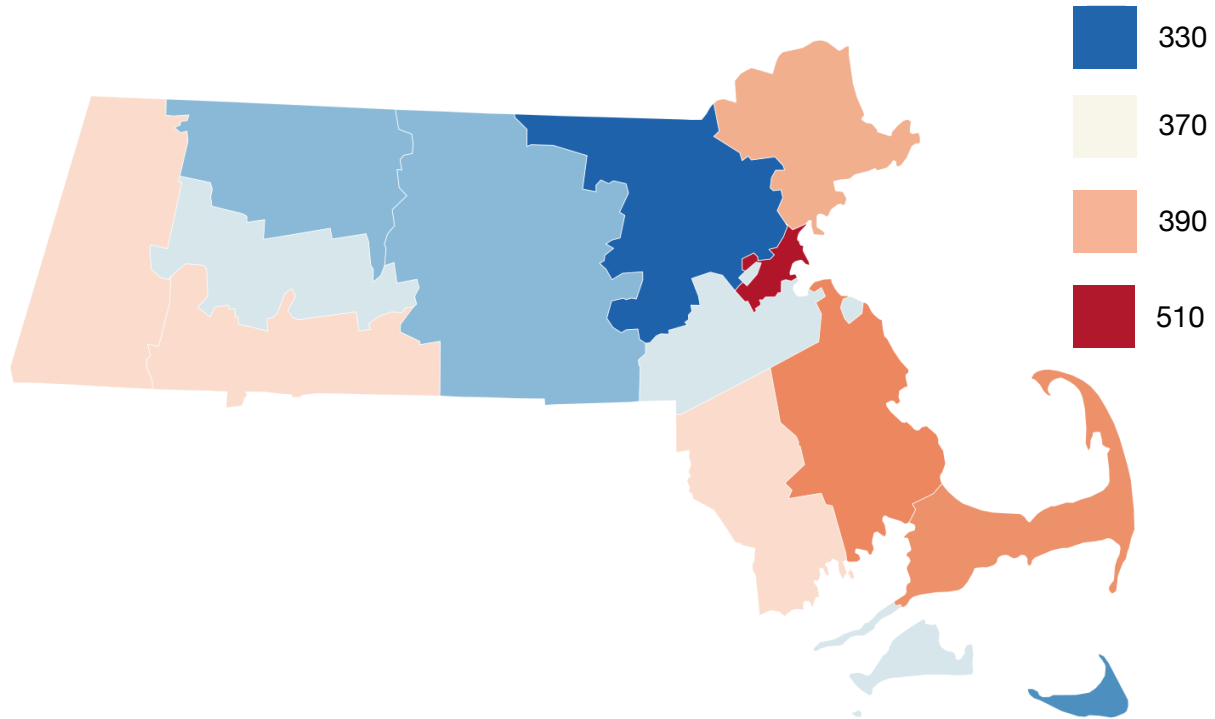
Number of Information Calls by State:

Information calls include any calls in which someone did not come into contact with a poison and are seeking information regarding a poison-related question. Of the 36,790 total calls from Massachusetts, there were 3,798 information calls, making up 80.36% of the total information calls. Of the 5,131 total calls from Rhode Island, there were 382 information calls, comprising 8.08% of the total information calls.



Where do Poisonings occur geographically?

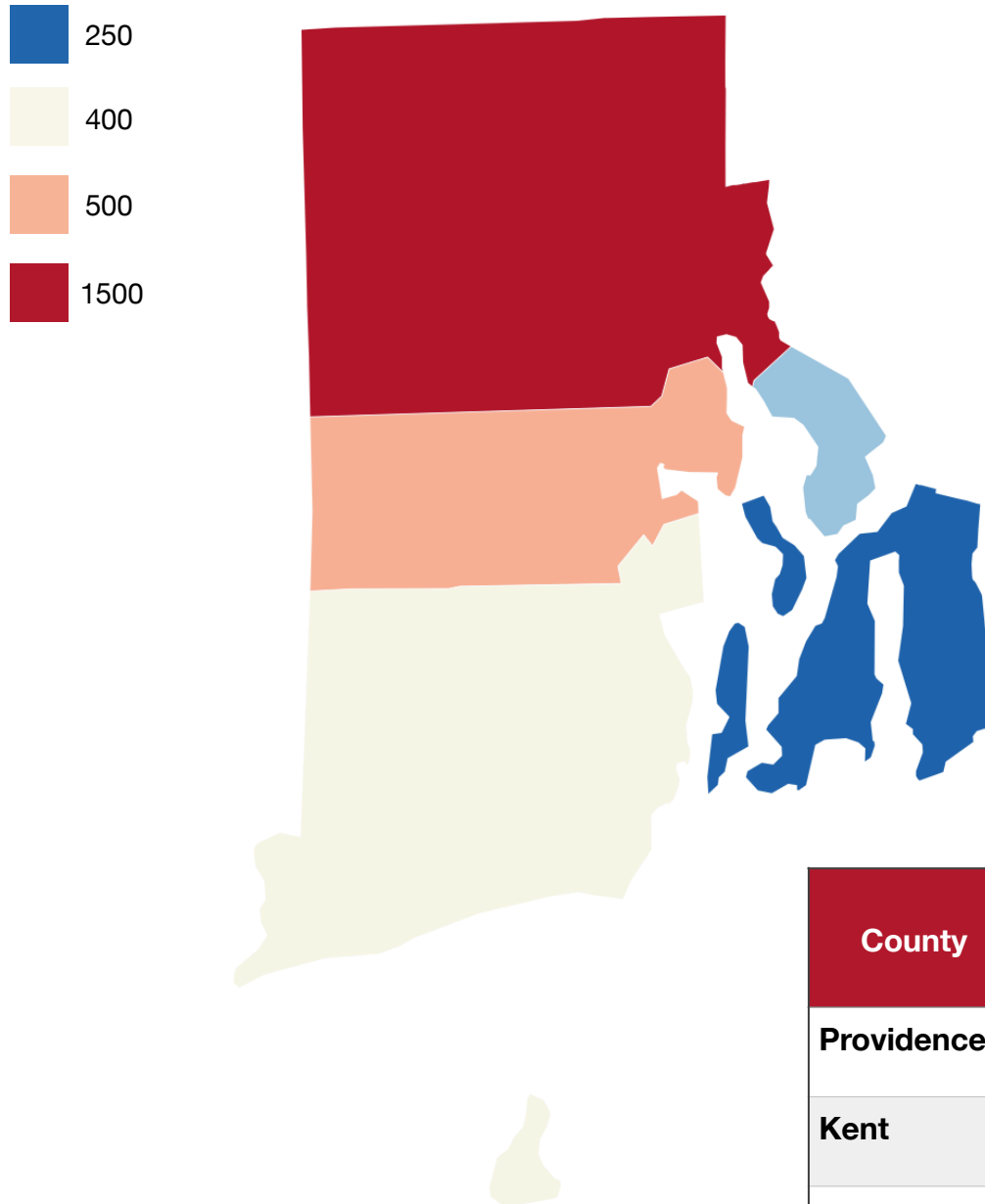
Massachusetts Exposure Call Rate by County



County	Call Rate per 100,000
Suffolk	509
Plymouth	430
Barnstable	427
Essex	395
Bristol	388
Hampden	387
Berkshire	384
Hampshire	367
Norfolk	364
Dukes	364
Worcester	351
Franklin	351
Nantucket	347
Middlesex	334

Where do Poisonings occur geographically?

Rhode Island Exposure Call Rate by County




County	Call Rate per 100,000
Providence	1,575
Kent	460
Washington	343
Bristol	268
Newport	252

With what were they poisoned?

Most Common Substances	Non-Pharmaceutical	Pharmaceutical
1	Cosmetics/Personal Care Products	Pain Relievers
2	Household Cleaners	Antidepressants
3	Foreign Bodies/Toys/Miscellaneous	Sedatives/Hypnotics/Antipsychotics
4	Pesticides	Cardiovascular Drugs
5	Plants	Antihistamines
6	Alcohol	Anticonvulsants
7	Chemicals	Topical Preparations
8	Arts/Crafts/Office Supplies	Stimulants & Street Drugs
9	Fumes/Gases/Vapors	Vitamins
10	Hydrocarbons	Cold & Cough Preparations

In 2018, the top three non-pharmaceutical substance exposures were cosmetics/personal care products, household cleaners, and foreign bodies/toys/miscellaneous. Foreign bodies/toys/miscellaneous includes objects such as glass, glow sticks, button batteries, and silica gel, etc. The top three pharmaceutical substance exposures were pain relievers, antidepressants and sedatives/hypnotics/antipsychotics. Sedatives/hypnotics/antipsychotics include sleep medicine and anti-anxiety medicine.

A patient may be exposed to more than one substance in a poisoning or overdose.



5,386 exposure calls were for therapeutic errors

How were they Poisoned?

Route of Exposure



Ingestion

85.02% (35,894)



Inhalation

4.95% (2,088)



Dermal

4.67% (1,970)



Ocular

3.78% (1,596)

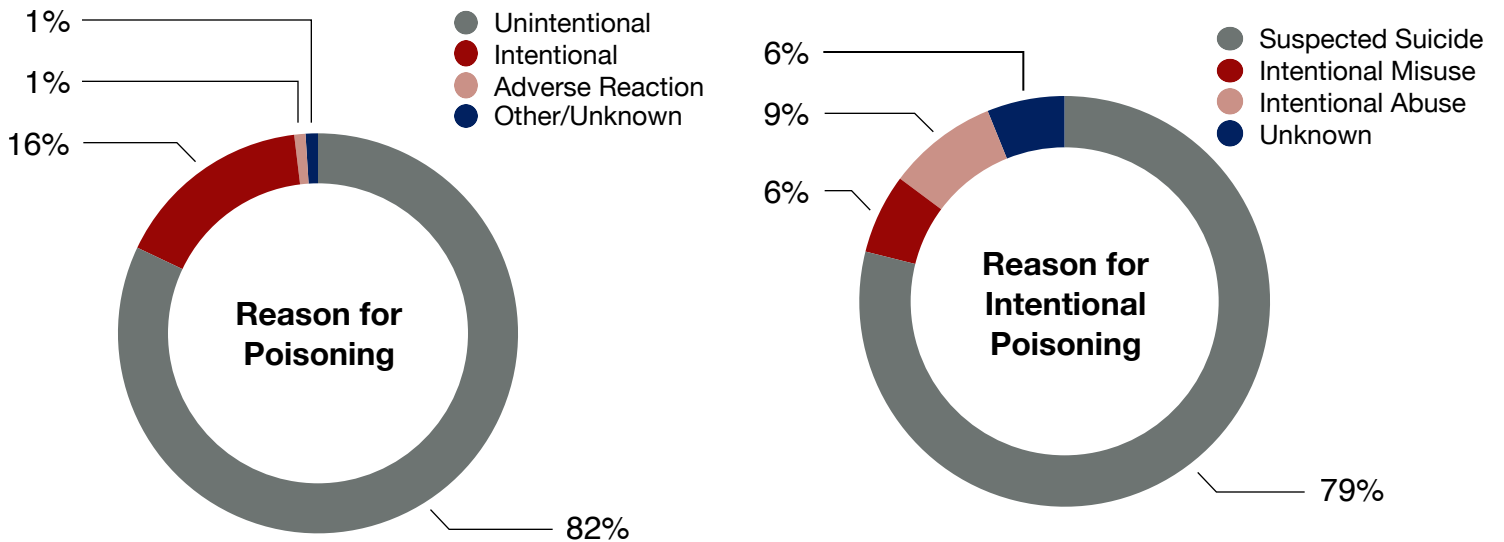


Parenteral

0.54% (229)

The most common route of exposure for calls to the Poison Center is through ingestion or by swallowing a substance (85.02%). The next most common route of exposure is by inhalation or nasal absorption (4.95%), and then dermal or skin contact (4.67%), ocular or contact through the eyes (3.78%), and parenteral or administered by means other than oral or rectal, particularly by injection (0.54%).

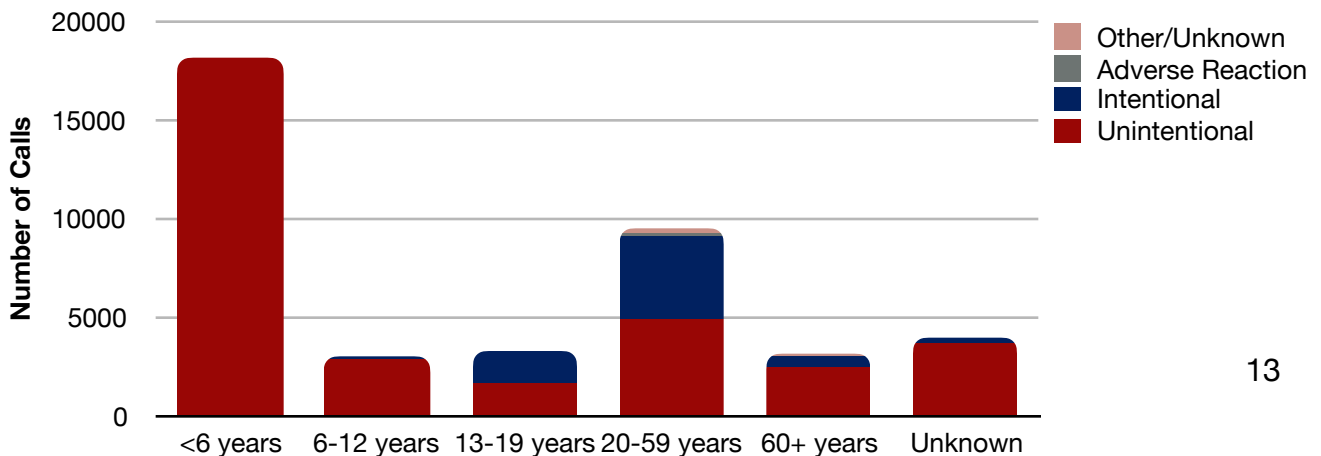
What was the Intent of the Poisoning?



The majority of poison exposures were recorded as unintentional (82%). Of the 41,253 exposure calls, 6,621 (16%) were classified as intentional poisonings. Of the intentional poisonings, 5,224 (79%) were recorded as suspected suicides. “Intentional abuse” accounted for 9% of the intentional poisonings, while “intentional misuse” and “unknown intentional reasoning” both accounted for 6% of intentional poisonings. For definitions, please see the appendix.

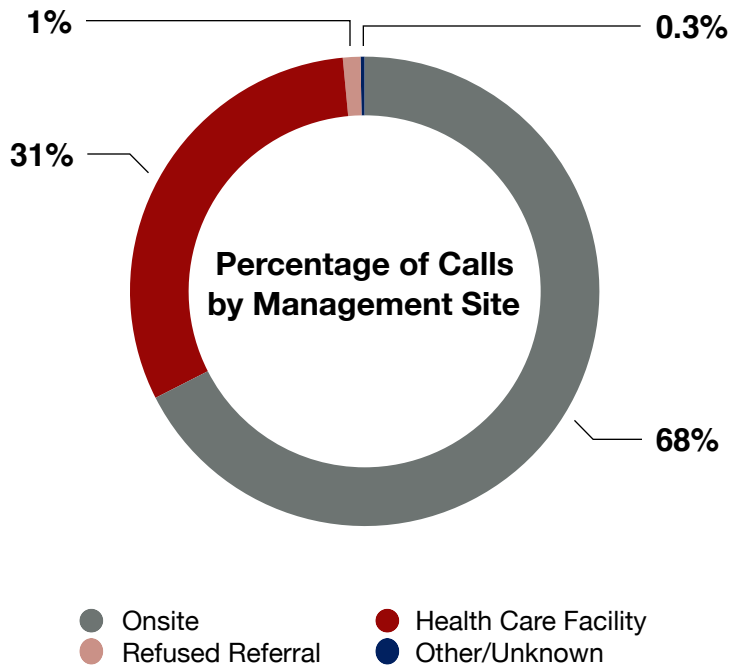
Intent by Age

The majority of exposures for children less than six years old were unintentional (18,155). The majority of intentional exposures occurred in the 20-59 years age group (4,184 exposures) and the 13-19 years age group (1,591 exposures). Adverse reaction calls were most common in the 20-59 years age group, accounting for about 169 adverse reaction exposures.



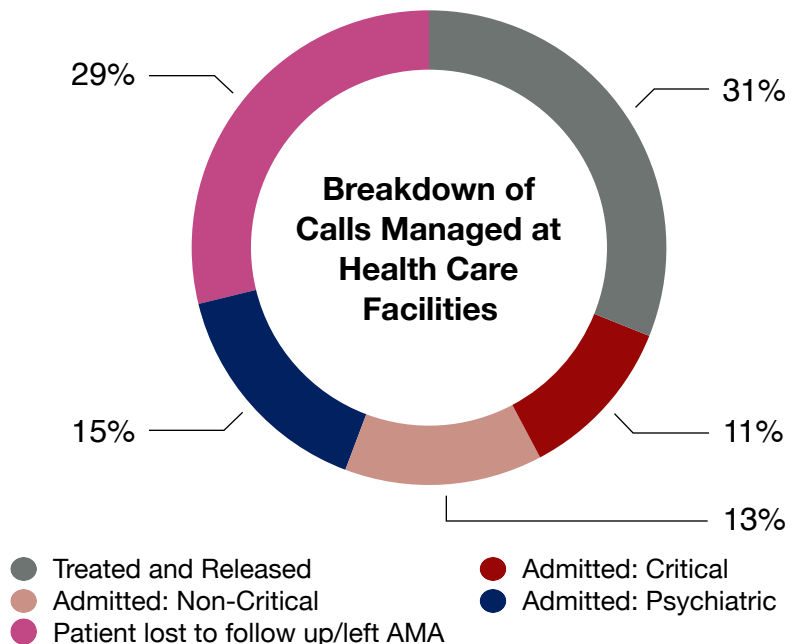
Treatment

Where were the poisonings managed?



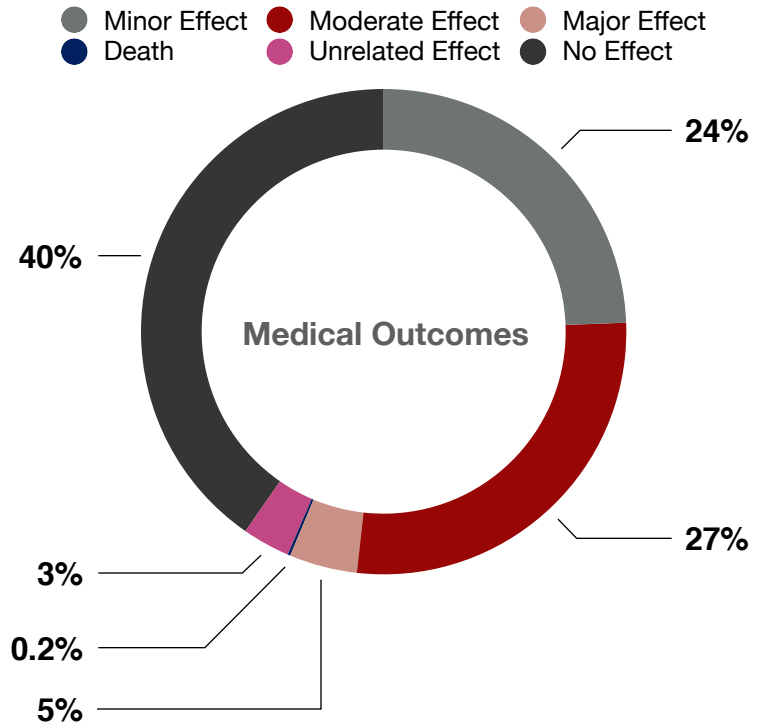
The majority of exposure calls, 27,847 (68%), were managed on-site and did not require treatment at a health care facility. 12,790 (31%) of exposure calls were treated at a health care facility, while 616 (1%) refused referral or the treatment site was unknown.

Of the 12,790 cases managed at a health care facility, there were 3,973 (31%) treated and released, 1,430 (11%) admitted to critical care units, 1,725 (13%) admitted to non-critical care beds, and 1,977 (15%) admitted to psychiatric care; and 3,685 (29%) were lost to follow up.



Medical Outcomes

Less than 1% of our exposure calls result in death. Only 5% of our cases result in a major effect. While, 27% of our exposures result in a moderate effect, and 24% of cases result in a minor effect. The majority of exposure calls received to the Center (40%) have no effect and an additional 3% have an unrelated effect.



Definition of Medical Outcomes:

Death: The patient died as a result of the exposure or as a direct complication of the exposure which was unlikely to have occurred had the toxic exposure not preceded the complication. Only included are those deaths that are probably or undoubtedly related to the exposure.

Major Effect: The patient exhibited symptoms as a result of the exposure. The symptoms were life-threatening or resulted in significant residual disability or disfigurement.

Moderate Effect: The patient exhibited symptoms as a result of the exposure that were more pronounced, more prolonged or more of a systemic nature than minor symptoms.

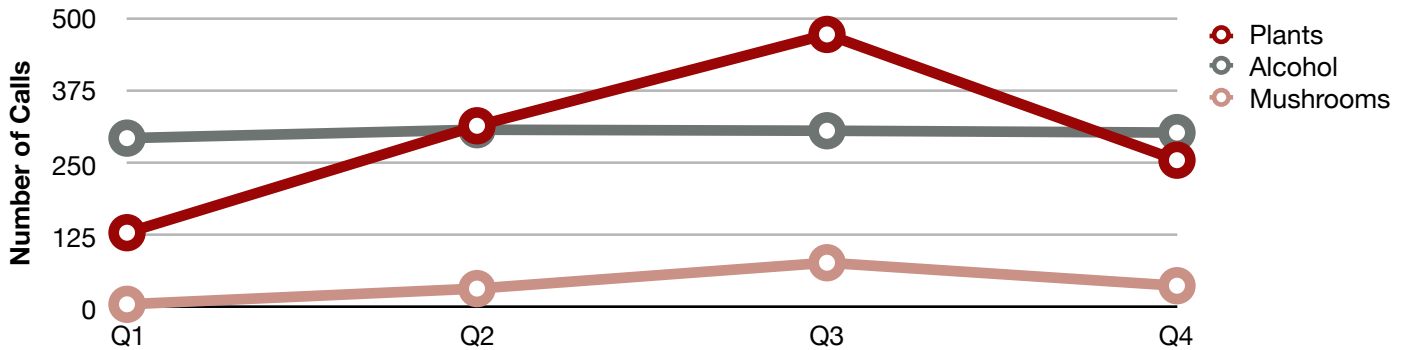
Minor Effect: The patient exhibited some symptoms as a result of the exposure, but they were minimally bothersome to the patient. The patient has returned to a pre-exposure state of well-being and has no residual disability or disfigurement.

Unrelated Effect: Based upon all information available, the exposure was probably not responsible for the effect(s).

No Effect: The patient developed no symptoms as a result of the exposure.

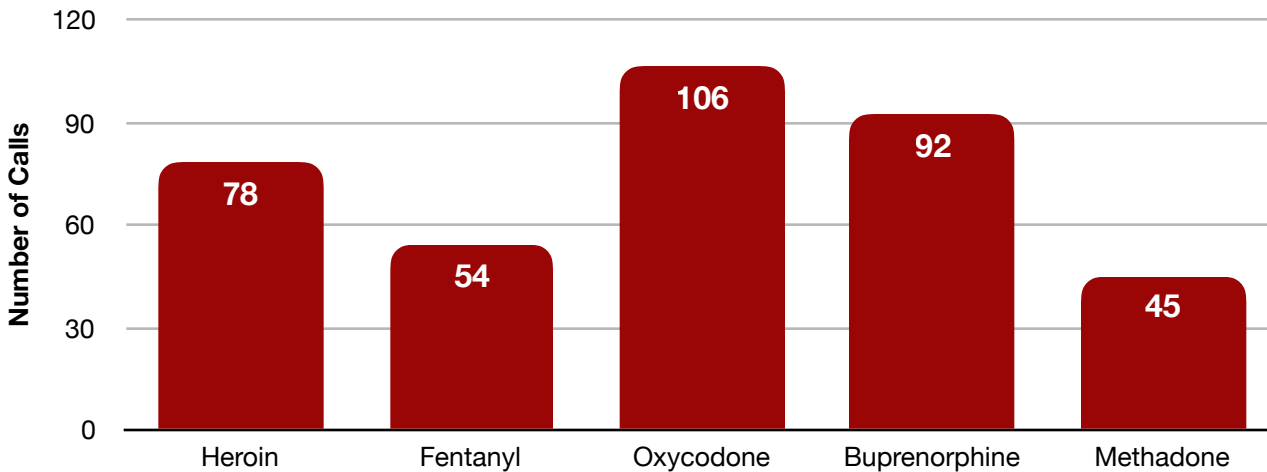
Poisoning Trends

Five Year Quarterly Average for Seasonal Trends: Plants, Alcohol, and Mushrooms



Seasonal trends the Poison Center tends to observe each year are exposures from plants, alcohol, and mushrooms. Plant exposures tend to increase during Q3 (July-September), when people spending more time outdoors. Alcohol remained steady across the year. Mushroom exposures spike in Q3 (July-September) when fungi are at their height of the growing season. People often mistaken poisonous mushrooms as edible. If a mushroom poisoning occurs, the Poison Center can help to identify which mushroom was ingested and how to treat it.

Opioids:



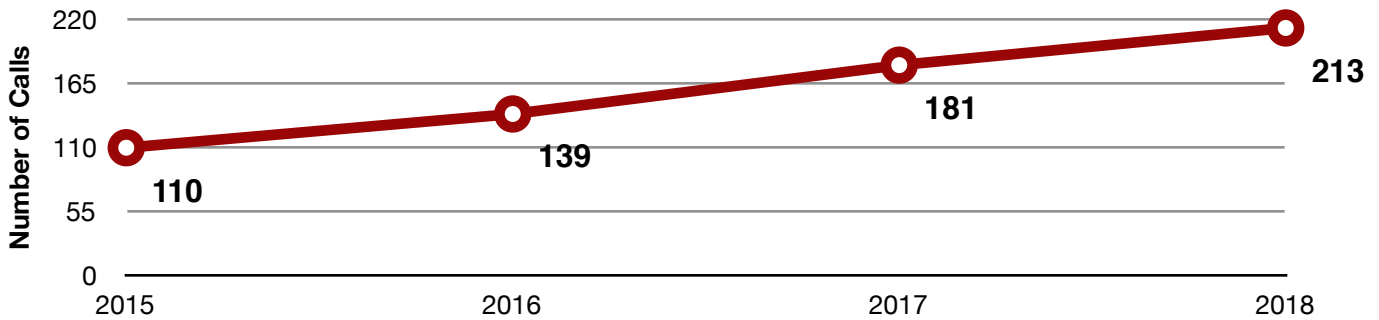
In the midst of the opioid epidemic, another trend the Poison Center continues to see are exposures to opioids. In 2018, the Poison Center received 546 opioid exposure calls. Of these 546 exposures, 322 were complicated cases. Complicated cases are defined as those that involve more than one substance. In 2018, the Poison Center's top five opioid exposure cases involved Oxycodone (106 calls), Buprenorphine (92 calls), Heroin (78 calls), Fentanyl (54 calls), and Methadone (45 calls).

Poisoning Trends

Marijuana:

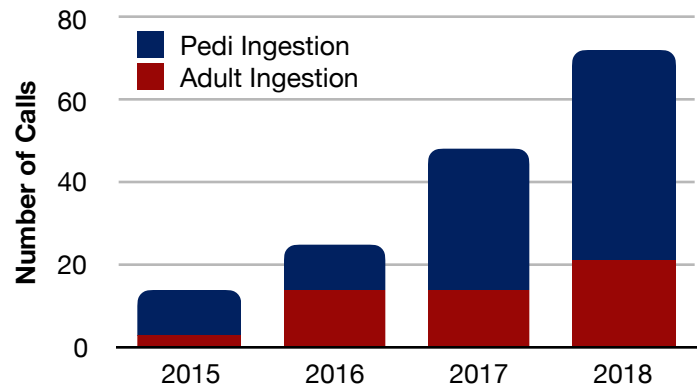
The Poison Center has noticed an increasing trend in marijuana calls since recreational legalization in Massachusetts. The number of calls has increased from 110 in 2015 to 213 in 2018.

Total Marijuana Calls in Massachusetts

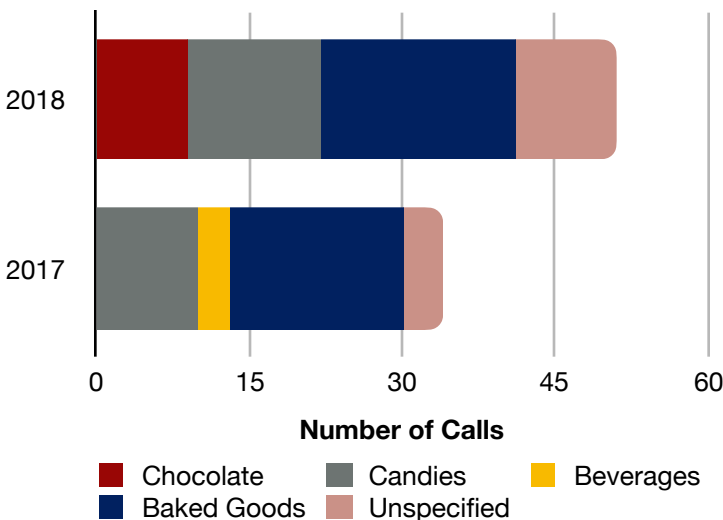


In particular, the Poison Center has seen an increase in pediatric ingestions of marijuana edible products. In 2015, the Poison Center received 10 calls for pediatric ingestions of marijuana products compared to 52 calls in 2018.

Marijuana Edible Ingestions by Age in Massachusetts



Pediatric Ingested Marijuana Edible Product Type



The Poison Center received the most calls for pediatric ingestions of marijuana infused baked goods (19 in 2018 and 17 in 2017). The second most common marijuana edibles of pediatric exposures were candies (13 exposures in 2018 and 10 in 2017). The Poison Center has also received numerous calls for marijuana infused chocolates and beverages.

Public Education

Direct Outreach

The Poison Center's Education Coordinator conducts education sessions across Massachusetts and Rhode Island to raise awareness of the Poison Center's services and the best methods for poison prevention. The Educator identifies organizations for trainings and conducts outreach to these identified organizations to set up education sessions in poison prevention. These organizations include early education centers, Head Start Centers, councils on aging, senior centers, community health network associations, public health coalitions, departments of health, and various community-based non-profits. In 2018, the Educator trained over 300 participants in poison prevention through direct education sessions. These participants included parents and caregivers of young children, older adults, and health care professionals.

Material Distribution

The Poison Center offers a variety of educational materials. These materials include brochures (offered in English, Spanish, Portuguese, Haitian Creole, Vietnamese, Chinese, and Arabic), magnets, stickers, magnifiers to read medication labels, and informational fact sheets. In 2018, the Educator distributed over 8,000 brochures, 10,000 magnets, 14,000 stickers, and 3,000 magnifiers. All

materials are free for anyone residing in Massachusetts or Rhode Island and can be shipped to your address free of charge.

Materials can be ordered through our website, www.maripoisoncenter.com, or by calling the Poison Center Hotline, 1-800-222-1222

Data Collection and Annual Reports

The Poison Center serves as a public health hotline and can be the first to raise alarm about toxic products, such as opioid trends, laundry detergent pods, marijuana edibles, and medication side effects. All of our calls get logged into a database called Toxicall. From our data, we generate reports, such as this one, to educate the public and health care professionals on relevant poison trends. The Educator is responsible for collecting this data and generating monthly and annual reports for the Massachusetts Department of Public Health and the Rhode Island Department of Health. Any data pertaining to poisoning trends is provided upon request of the Massachusetts Department of Public Health so immediate action can be taken following what may be a poisoning trend or threat.

Research Presentations & Publications

Barash JA, Ganetsky M, Demaria A. More on Acute Amnestic Syndrome Associated with Fentanyl Overdose. *N Engl J Med.* 2018;378(23):2247-2248.

Needleman RK, Neylan IP, Erickson T. Potential Environmental and Ecological Effects of Global Climate Change on Venomous Terrestrial Species in the Wilderness. *Wilderness Environ Med.* 2018;29(2):226-238.

Brooks J, Erickson TB, Kayden S, Ruiz R, Wilkinson S, Burkle FM. Responding to chemical weapons violations in Syria: legal, health, and humanitarian recommendations. *Confl Health.* 2018;12:12.

Ouchi K, Lindvall C, Chai PR, Boyer EW. Machine Learning to Predict, Detect, and Intervene Older Adults Vulnerable for Adverse Drug Events in the Emergency Department. *J Med Toxicol.* 2018;14(3):248-252.

Chai PR, Hayes BD, Erickson TB, Boyer EW. Novichok agents: a historical, current, and toxicological perspective. *Toxicol Commun.* 2018;2(1):45-48.

Hauptman M, Woolf AD. Lead Poisoning and Children in Foster Care: Diagnosis and Management Challenges. *Clin Pediatr (Phila).* 2018;57(8):988-991.

Barash JA, Ganetsky M, Boyle KL, et al. Acute Amnestic Syndrome Associated with Fentanyl Overdose. *N Engl J Med.* 2018;378(12):1157-1158.

Griswold MK, Chai PR, Krotulski AJ, et al. Self-identification of nonpharmaceutical fentanyl exposure following heroin overdose. *Clin Toxicol (Phila).* 2018;56(1):37-42.

Lai JT, Chapman BP, Boyle KL, Boyer EW, Chai PR. Low-energy Bluetooth for detecting real-world penetrance of bystander naloxone kits: a pilot study. *Proc Annu Hawaii Int Conf Syst Sci.* 2018;2018:3253-3258.

Toce MS, Farias M, Powell AJ, Daly KP, Vargas SO, Burns MM. Myocardial Infarct After Marijuana Inhalation in a 16-year-old Adolescent Boy. *Pediatr Dev Pathol.* 2018;:1093526618785552.

Rodan LH, Hauptman M, D'gama AM, et al. Novel founder intronic variant in SLC39A14 in two families causing Manganism and potential treatment strategies. *Mol Genet Metab.* 2018;124(2):161-167.

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Appendix

Intent of Exposure:

Unintentional general: All unintentional exposures not otherwise defined below.

- **Environmental:** Any passive, non-occupational exposure that results from contamination of air, water, or soil. Environmental exposures are usually caused by manmade contaminants.
- **Occupational:** An exposure that occurs as a direct result of the person being on the job or in the workplace.
- **Therapeutic error:** An unintentional deviation from a proper therapeutic regimen that results in the wrong dose, incorrect route of administration, administration to the wrong person, or administration of the wrong substance. Only exposures to medications or products used as medications are included. Drug interactions resulting from unintentional administration of drugs or foods which are known to interact are also included.
- **Unintentional misuse:** Unintentional, improper or incorrect use of a nonpharmaceutical substance. Unintentional misuse differs from intentional misuse in that the

exposure was unplanned or not foreseen by the patient.

- **Bite/sting:** All animal bites and stings, with or without envenomation, are included.
- **Food poisoning:** Suspected or confirmed food poisoning; ingestion of food contaminated with microorganisms is included.
- **Unintentional unknown:** An exposure determined to be unintentional, but the exact reason is unknown.

Intentional:

- **Suspected suicidal:** An exposure resulting from the inappropriate use of a substance for reasons that are suspected to be self-destructive or manipulative.
- **Intentional misuse:** An exposure resulting from the intentional improper or incorrect use for reasons other than the pursuit of a psychotropic effect.
- **Intentional abuse:** An exposure resulting from the intentional improper or incorrect use where the patient was likely attempting to gain a high, euphoric effect or some other psychotropic effect, including recreational use of a substance for any effect.

- **Contaminant/tampering:** The patient is an unintentional victim of a substance that has been adulterated (either maliciously or unintentionally) by the introduction of an undesirable substance.
- **Malicious:** Patients who are victims of another person's intent to harm them.
- **Withdrawal:** Inquiry about or experiencing of symptoms from a decline in blood concentration of a pharmaceutical or other substance after discontinuing therapeutic use or abuse of that substance.

Adverse Reaction:

- **Adverse Reaction Drug:** Unwanted effects due to an allergic, hypersensitivity, or idiosyncratic response to the active ingredient(s), inactive ingredient(s) or excipient of a drug, chemical, or other drug substance when the exposure involves the normal, prescribed, labeled or recommended use of the substance.
- **Adverse Reaction Food:** Unwanted effects due to an allergic, hypersensitivity, or idiosyncratic response to a food substance.
- **Adverse Reaction Other:** Unwanted effects due to an allergic, hypersensitivity, or

idiosyncratic response to a substance other than drug or food.

Unknown Reason: Reason for the exposure cannot be determined or no other category is appropriate.

Medical Outcome:

No effect: The patient did not develop any signs or symptoms as a result of the exposure.

Minor effect: The patient developed some signs or symptoms as a result of the exposure, but they were minimally bothersome and generally resolved rapidly with no residual disability or disfigurement. A minor effect is often limited to the skin or mucus membranes (e.g., self-limited gastrointestinal symptoms, drowsiness, skin irritation, first degree dermal burn, sinus tachycardia without hypotension, and transient cough).

Moderate effect: The patient exhibited signs or symptoms as a result of the exposure that were more pronounced, more prolonged, or more systemic in nature than minor symptoms. Usually, some form of treatment is indicated. Symptoms were not life-threatening, and the patient had no residual disability or disfigurement (e.g., corneal abrasion, acid-base disturbance, high fever, disorientation, hypotension that is rapidly responsive to treatment, and isolated brief seizures that respond readily to treatment).

Major effect: The patient exhibited signs or symptoms as a result of the exposure that were life-threatening or resulted in significant residual disability or disfigurement (e.g., repeated seizures or status epilepticus, respiratory compromise requiring intubation, ventricular tachycardia with hypotension, cardiac or respiratory arrest, esophageal stricture, and disseminated intravascular coagulation).

Death: The patient died as a result of the exposure or as a direct complication of the exposure.

Not followed, judged as nontoxic exposure: No follow-up calls were made to determine the outcome of the exposure because the substance implicated was nontoxic, the amount implicated was insignificant, or the route of exposure was unlikely to result in a clinical effect.

Not followed, minimal clinical effects possible: No follow-up calls were made to determine the patient's outcome because the exposure was likely to result in only minimal toxicity of a trivial nature. (The patient was expected to experience no more than a minor effect.).

Unable to follow, judged as a potentially toxic exposure: The patient was lost to follow-up, refused follow-up, or was not followed, but the exposure was significant and may have resulted in a moderate, major, or fatal outcome.

Unrelated effect: The exposure was probably not responsible for the effect.

Confirmed non-exposure: This outcome option was coded to designate cases where there was reliable and objective evidence that an exposure initially believed to have occurred actually never occurred (e.g., all missing pills are later located). All cases coded as confirmed non-exposure are excluded from this report.

Death, indirect report: Death, indirect report are deaths that the poison center acquired from medical examiner or media, but did not manage nor answer any questions about the death.