



Medicine Safety for Children: An In-Depth Look at Calls to Poison Centers

March 2015



Medicine Safety for Children

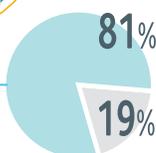
What's causing so many calls to poison centers?

1.34 M calls are made to poison centers each year for children.



49% are medicine-related.

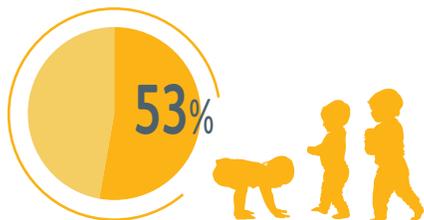
We analyzed **547,042** calls.



81% were for kids getting into medicine not meant for them.
19% were for kids getting too much medicine or getting the wrong medicine.

LITTLE KIDS

TEENS



Percent of total calls that were for children ages 1 and 2 years.



Percent of 15-19 year olds who have serious outcomes from medicine poisoning is 6 times greater than for 1-4 year olds.



Percent of ER visits for young children getting into medicine where the medicine belonged to grandparent, aunt or uncle.

10,000

Number of ER visits that occur each year for over-the-counter medicine overdoses by self-medicating teens.



WHAT KINDS OF MEDICINE?

The most common medicines that children under 4 get into are ibuprofen, multivitamins and diaper care and rash products.



The most common medicines that result in serious medical issues for teens include those used to treat mental health conditions or attention deficit hyperactivity disorder (ADHD).



Remember to save the Poison Help number on your phone.

1-800-222-1222

For more medication safety tips visit www.safekids.org

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K:IDS**
WORLDWIDE™

Executive Summary

What would you do if you suspected that a child in your care got into medicine? You find the child with an empty pill bottle and pills scattered on the floor. You're not sure how many pills the child might have swallowed, or if any were taken at all.

Fortunately there's a resource for parents and caregivers in case this happens: poison centers. In 2013, poison centers answered more than 1.34 million calls for children 19 and under from parents, family members and healthcare providers. Many of these calls are for children getting into medicine, getting too much medicine, or being given the wrong kind. In fact, in 2013 nearly half of calls to poison centers about children were related to medicine.¹

Safe Kids Worldwide, in partnership with the American Association of Poison Control Centers and with the support of McNeil Consumer Healthcare, analyzed data from the National Poison Data System to better understand what types of medicine children are getting into and how it happens.

In this report, we take a deeper look at two specific groups of calls related to medicine: unintentional-general exposures, when kids get into medicine without intending to take it, such as when a young child takes medicine on a nightstand; and unintentional-therapeutic errors, such as when a child is given too much medicine or the wrong medicine. This report doesn't include cases when a child or teen intentionally and purposefully took medicine or took too much medicine, such as taking a friend's medicine for a sports injury or otherwise misusing or abusing a medicine.

We found that there were 547,042 calls for unintentional-general and therapeutic error medicine exposures among children 19 and under in 2013. Of those, 81 percent were for kids getting into medicine not meant for them (unintentional-general exposures), and 19 percent were for kids getting too much medicine or getting the wrong medicine (unintentional-therapeutic errors).

Looking more closely, two groups of children stood out as being at greater risk for medicine poisoning: young children, particularly those ages 1 to 4, and teens ages 15 to 19.

Young children made up the vast majority of the calls we looked at: overall, 3 out of 4 calls were about a child ages 1 to 4. That's more than 1,100 calls every day about a young child getting into medicine or getting too much medicine. In fact, 1- and 2-year-olds alone accounted for 53 percent of the medicine-related unintentional-general and therapeutic error calls to poison centers. Analyzing poison center call data, we found that children were overwhelmingly getting into medicine in their own home.

Why might this be the case? One and 2-year-olds are explorers, and it's part of the natural development of children this age to walk alone, stand on tiptoe, climb up on furniture without an adult, and turn over containers to pour out the contents—all behaviors that can put a child at risk if medicine is left within sight on a low counter, nightstand or in a purse.² And previous research shows that visiting family members should be reminded about keeping medicine up and away: in 2013 research from Safe Kids, we found that in 43 percent of emergency department visits for young children getting into medicine, the medicine belonged to a grandparent, aunt, or uncle.³

While young children get into medicine the most often, teens experience a greater proportion of serious effects. The percent of unintentional-general calls resulting in moderate or major effects was more than 6-times higher among teenagers ages 15 to 19, than children ages 1 to 4. This points to an urgent need to educate families, and in particular pre-teens and teens, about responsibly using medicine.



Top Tips to Keep Kids Safe around Medicine

Every parent and caregiver plays a role in keeping children and teens safe around medicine, and it starts with these simple steps:

FOR PARENTS OF LITTLE KIDS Ages 5 and Under

- **Put all medicine up and away and out of sight, including your own.** Make sure that all medicine and vitamins are stored out of reach and out of sight of children. Consider places where kids get into medicine, like in purses, counters and nightstands.
- **Consider products you might not think about as medicine.** Most parents store medicine up and away—or at least the products they consider to be medicine. You may not think about products such as diaper rash remedies, vitamins or eye drops as medicine, but they actually are and need to be stored safely.
- **Use the dosing device that comes with the medicine.** Proper dosing is important. Kitchen spoons aren't all the same, and a teaspoon or tablespoon used for cooking won't measure the same amount as the dosing device.
- **Write clear instructions for caregivers about your child's medicine.** When other caregivers are giving your child medicine, write clear instructions about what medicine to give, when to give it and how much to give.

FOR PARENTS OF BIG KIDS Ages 6 to 10

- **Teach your child that medicine should always be given by an adult.** It's important for kids to know that medicine should not be taken on their own. Parents and caregivers can help make sure they are taking it correctly.
- **Don't refer to medicine as candy.** While saying medicine is candy may make it easier to get your child to take medicine, it may encourage them to try it on their own.
- **Take the time to read the drug facts or prescription label with your child, even for over-the-counter (OTC) medicine.** As your kids get older, it's important to teach them how to read and understand the label before taking medicine.

- **Model responsible medication behavior.** What kids see us doing is a much stronger message than what we tell them to do. Make sure to store medicine out of the reach of children, read drug facts and prescription labels before taking medicine and follow the recommended dose.

FOR PARENTS OF PRE-TEENS AND TEENS Ages 11 and Up

- **Educate pre-teens and teens on how to read an over-the-counter drug facts or prescription label.** Take the time to teach them about each section of a drug facts label and its purpose. For a great resource on this topic, visit: <http://bit.ly/18xpWLB>.
- **Communicate to pre-teens and teens the importance of only taking medicine that is meant for them.** Taking medicine that belongs to someone else or misusing medicines (even OTCs) can cause harm.
- **Teach pre-teens and teens that medicine labels are rules, not guidelines.** Be sure they know that taking more than the recommended dose will not help them get relief any faster, and it could hurt them.
- **Check in with them and talk about medicine they are taking regularly.** Even pre-teens and teens who need to take medicine daily may make errors in dose or dosing frequency, so it is important to communicate with them regularly about taking medicine responsibly.

FOR EVERYONE

- **Save the toll-free Poison Help line number on your home and cell phones: 1-800-222-1222.** You can also put the number on your refrigerator or another place in your home where babysitters and caregivers can see it. And remember, the Poison Help line is not just for emergencies, you can call with questions about how to take or give medicine and concerns about other potential dangers, including reactions to plants and mushrooms, bites and stings, chemicals, carbon monoxide, pesticides, and more.

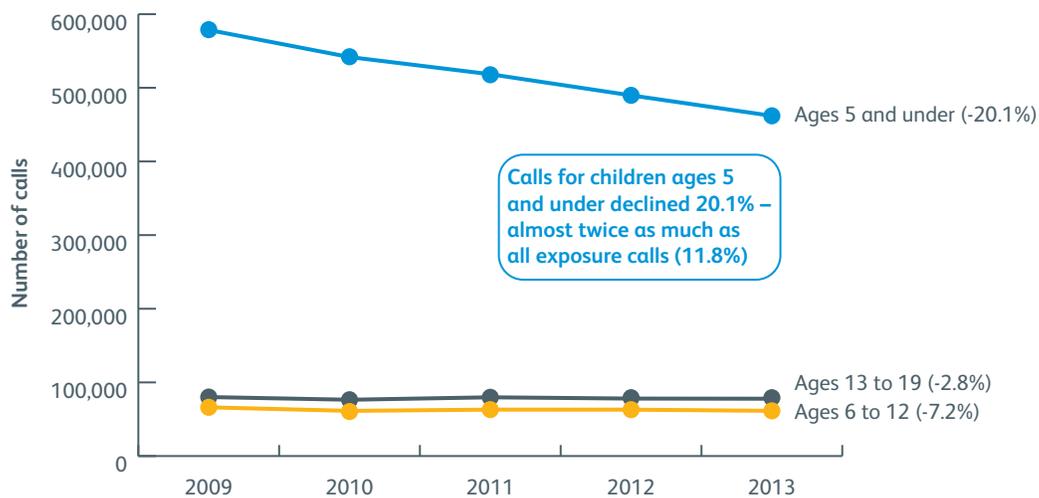
Calls to Poison Centers: The Big Picture

Poison centers received 1,341,862 calls about children 19 and under who were exposed to medicine, cleaning products, poisonous plants, noxious gases and other potentially dangerous substances in 2013.¹ Poison centers refer to these cases as “exposures”—when a person was exposed to a substance that could potentially be harmful. Of the 1.34 million calls to poison centers, nearly half—660,921 calls—were related to a child getting into medicine.¹ These include calls when the medicine was taken unintentionally, and when it was taken with the intent to misuse or abuse it.

The good news is that among children ages 5 and under, we’ve seen a decrease since 2009 in the number of single substance calls about medicine exposures (Figure 1).^{1,4-7} From 2009 to 2013, total exposure calls to poison centers for all ages and products fell 11.8 percent.^{1,4-7} During the same time period, the number of single substance medicine-related calls for children under 5 declined 20.1 percent, nearly twice as much as all exposure calls, resulting in 116,500 fewer calls.^{1,4-7}

The number of single substance medicine-related exposure calls for children ages 6 to 12 and ages 13 to 19 fell considerably less than all exposure calls. For example, the number of medicine exposure calls for children ages 6 to 12 fell 7.2 percent, and the number of calls for children ages 13 to 19 decreased by only 2.8 percent.

Figure 1. Number of medicine-related calls to poison centers, 2009-2013^{1,4-7}



To take a closer look at how children are getting into medicine, Safe Kids partnered with the American Association of Poison Control Centers to explore 2013 data from the National Poison Data System. The National Poison Data System is a near real-time database of poisoning exposure and information calls collected from 55 poison centers covering the entire population of the United States.¹ The database is a valuable tool for assessing trends in poisonings and for identifying risk factors of dosing errors and unsupervised ingestions of medicine.

For our analysis, we looked at two particular categories of exposure calls to poison centers: unintentional-general calls, such as when a child gets into medicine, and unintentional-therapeutic error calls, when a child gets the wrong dose or the wrong kind of medicine. This doesn’t include cases when a child or teen purposefully took medicine with the intention to misuse or abuse it. We looked at cases when a child ingested (swallowed) a product, and at least one of the products was medicine. Among unintentional exposures, we wanted to find out who is most at risk, and to better understand why.



Young Children: More than 1,100 Calls a Day

There were 547,042 calls for unintentional-general and therapeutic error exposures for children 19 and under in 2013. Of those, 81 percent were for unintentional-general exposures, such as kids getting into medicine, and 19 percent were for therapeutic errors, when kids get too much medicine or get the wrong medicine. While a smaller proportion of calls were for therapeutic errors than unintentional-general exposures, in the last decade there has been an increase in these kinds of calls. A study found that the number of calls related to young children getting too much medicine or the wrong kind of medicine outside of a hospital increased 43 percent from 2002 to 2012, with the exception of calls related to cough and cold medicine.⁸

For unintentional-general and therapeutic error exposures, young children accounted for the vast majority of calls. Overall, 3 out of 4 calls where we have information on the child's age—410,922 calls—were about a child ages 1 to 4 (Figure 2). That's more than 1,100 every day. Forty-seven percent of calls were about girls, and 53 percent were about boys, although this varied by age (Figure 3). Among children of all ages, we found that 1- and 2-year-olds accounted for 53 percent of unintentional-general and therapeutic error calls to poison centers (Figure 4).

Figure 2. Number of unintentional-general & therapeutic error medicine exposure calls for children 19 and under by age group, 2013

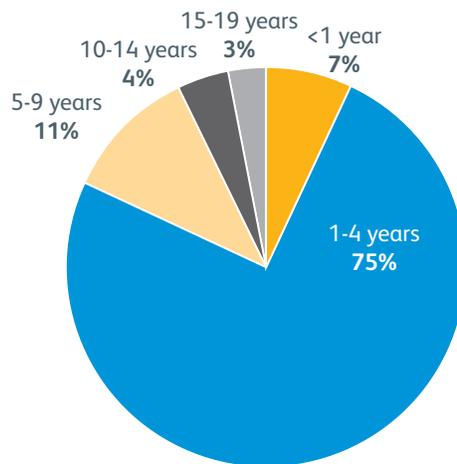


Figure 3. Number of unintentional-general & therapeutic error medicine exposure calls by gender and age group, 2013

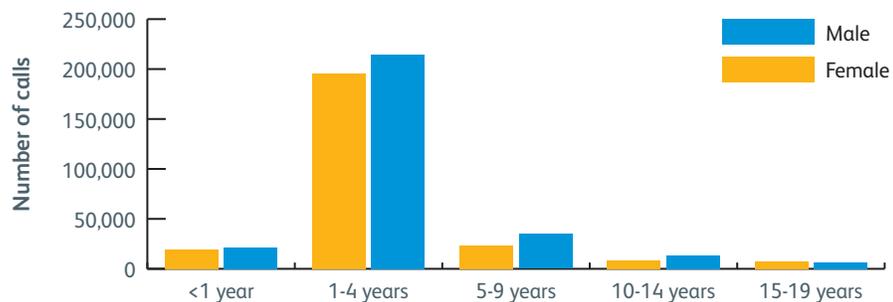
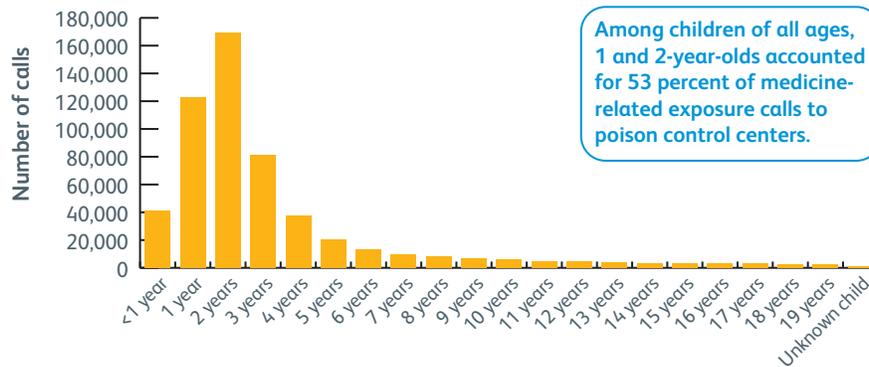


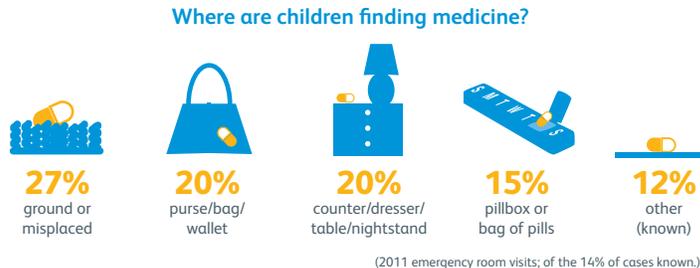
Figure 4. Number of unintentional-general & therapeutic error medicine exposure calls for children 19 and under, 2013



Why are so many children ages 1 to 2 years old getting into medicine? While every child is different, the American Academy of Pediatrics says that movement milestones for one-year-olds include pulling themselves up to stand and walking while holding onto furniture.² For two-year-olds, they include walking alone; standing on tiptoe; climbing onto and down from furniture without the help of an adult; and turning over containers to pour out their contents.² All of these skills are important to develop, but they also mean that children this age are at risk for getting into medicine left within reach.

Young children can easily confuse medicine for candy, especially when medicine is left out on a kitchen counter or in a purse or briefcase. Previous Safe Kids research found that in 67 percent of emergency room visits for medicine poisoning, the medicine was left within reach of a child such as in a purse, on a counter or dresser, or on the ground.³ Consider places where kids can get into medicine, and put all medicines up and away from young children after every use.

A previous study from Safe Kids looking at a sample of emergency department data found that kids often get into medicine when it's left out.³



Next, we looked at what types of medicine young children get in to. Since children can get into more than one medicine at a time, poison centers collect information on every product the child took. So, we looked at 594,379 records of medicine exposures.

Among the unintentional-general exposures, we found that the top medicine that children under the age of 1 got into was diaper care and rash products, involved in 19 percent of the cases for children this age (Table 1). Diaper rash products are meant to soothe baby's irritated skin, but if inhaled it can cause lung damage and can cause nausea, vomiting or diarrhea if swallowed.⁹

For children ages 1 to 4, the top medicines involved in unintentional-general exposures were ibuprofen (8 percent), multiple vitamins for children and adults (8 percent), and diaper care and rash products (6 percent). Many of these products are available over-the-counter, without a doctor's prescription. It's easy to think that because over-the-counter medicine and vitamins don't need a prescription from a doctor, that they're not as dangerous. But that isn't necessarily true; medicines are designed to cause specific changes in the body, so any medicine can be dangerous if taken by the wrong person, in the wrong amount, or in the wrong way. For example, multiple vitamins can be poisonous if taken in overdose, and the most serious risks come from iron or calcium.¹⁰

Poison centers also capture information on what happened to the patient—the medical outcome. These can range from no effects, to minor effects such as drowsiness or mild stomach problems. More seriously, patients can experience moderate effects such as isolated, brief seizures or disorientation, or major effects such as cardiac or respiratory arrest.

Table 1. Top Ten Products in Unintentional-General Exposures by Age Group, 2013

	<1 year (n=27,159)	1-4 years (n= 405,930)	5-9 years (n=31,876)	10-14 years (n=5,937)	15-19 years (n=4,882)
1	Diaper Care and Rash Products 19.3%	Ibuprofen 8.4%	Multiple Vitamins 20.8%	Multiple Vitamins 14.3%	Ibuprofen 7.8%
2	Ibuprofen 7.1%	Multiple Vitamins 7.6%	Acetaminophen Alone 5.2%	Ibuprofen 5.5%	Acetaminophen Alone 4.9%
3	Acetaminophen Alone 5.5%	Diaper Care and Rash Products 6.1%	Ibuprofen 5.1%	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 4.7%	Multiple Vitamins 4.1%
4	Topical Antifungal Preparations 3.3%	Acetaminophen Alone 5.8%	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 4.9%	Acetaminophen Alone 3.6%	Benzodiazepines 2.9%
5	Camphor 3.1%	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 3.7%	Melatonin 3.1%	Atypical Antipsychotics 2.5%	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 2.9%
6	Multiple Vitamins 2.8%	Calcium and Calcium Salts 2.8%	Calcium and Calcium Salts 2.5%	Melatonin 2.4%	Atypical Antipsychotics 2.8%
7	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 2.6%	Laxatives 2.3%	Systemic Antibiotic Preparations 2.2%	Diphenhydramine Alone (Unknown if OTC or Rx) 2.3%	Diaper Care and Rash Products 2.5%
8	Topical Steroids 2.2%	Camphor 2.0%	Diphenhydramine Alone (Unknown if OTC or Rx) 2.2%	Diaper Care and Rash Products 2.0%	Diphenhydramine Alone (Unknown if OTC or Rx) 2.3%
9	Topical Antibiotic Preparations 1.8%	Diphenhydramine Alone (Unknown if OTC or Rx) 1.9%	Laxatives 2.1%	Methylphenidate 2.0%	Systemic Antibiotic Preparations 2.2%
10	Systemic Antibiotic Preparations 1.7%	Melatonin 1.8%	Leukotriene Antagonist or Inhibitor 1.8%	Miscellaneous Unknown Drugs 1.8%	Hydrogen Peroxide 3% 1.9%

Missing age=635

*Out of 594,379 case records for unintentional-general and unintentional-therapeutic error.

**Acetaminophen alone includes pediatric, adult, and unknown if pediatric or adult. This facilitates comparison to other general categories of medicine on the list.

***Multiple vitamins includes pediatric and adult formulations, in tablets and liquids, and unspecified multiple vitamins.



Among the unintentional-general and therapeutic error cases where a child ages 1 to 4 experienced moderate or major effects, the medicines most often involved were clonidine used to treat high blood pressure and ADHD (10 percent); benzodiazepines used to treat conditions such as anxiety and insomnia (7 percent); and amphetamines and related compounds often used to treat ADHD (6 percent) (Table 2). Interestingly, benzodiazepines were also identified in a study looking at hospitalizations for young children who got into medicine that found that the types of medicine most often involved were opioids (prescription pain relievers) and benzodiazepines.¹¹

Table 2. Top Ten Products Resulting in Moderate or Major Effects by Age Group, 2013

	<1 year (n=515)	1-4 years (n= 6,548)	5-9 years (n=1,356)	10-14 years (n=690)	15-19 years (n=935)
1	Amphetamines and Related Compounds 10.3%	Clonidine 10.0%	Clonidine 14.8%	Atypical Antipsychotics 10.4%	Atypical Antipsychotics 6.7%
2	Clonidine 6.4%	Benzodiazepines 6.8%	Atypical Antipsychotics 9.4%	Clonidine 9.1%	Amphetamines and Related Compounds 4.2%
3	Miscellaneous Unknown Drugs 4.3%	Amphetamines and Related Compounds 6.4%	Antihypertensives (Excluding Diuretics) 8.3%	Antihypertensives (Excluding Diuretics) 6.8%	Diphenhydramine Alone (Unknown if OTC or Rx) 3.7%
4	Atypical Antipsychotics 3.9%	Oral Hypoglycemics: Sulfonylureas 5.0%	Methylphenidate 6.3%	Methylphenidate 6.5%	Clonidine 3.5%
5	Buprenorphine 3.7%	Atypical Antipsychotics 5.0%	Amphetamines and Related Compounds 6.3%	Amphetamines and Related Compounds 6.1%	Acetaminophen Alone 3.3%
6	Oxycodone Alone or in Combination (Excluding Combination Products with Acetaminophen or Acetylsalicylic Acid) 3.3%	Miscellaneous Unknown Drugs 3.5%	Other Types of Sedative/Hypnotic/ Anti-Anxiety or Anti-Psychotic Drug 4.1%	Other Types of Sedative/Hypnotic/ Anti-Anxiety or Anti-Psychotic Drug 3.3%	Benzodiazepines 3.1%
7	Benzodiazepines 2.9%	Beta Blockers (Including All Propranolol Cases) 2.8%	Miscellaneous Unknown Drugs 3.3%	Benzodiazepines 2.9%	Ibuprofen 2.9%
8	Methylphenidate 2.7%	Diphenhydramine Alone (Unknown if OTC or Rx) 2.6%	Benzodiazepines 3.1%	Diphenhydramine Alone (Unknown if OTC or Rx) 2.5%	Dextromethorphan Preparations (Not Otherwise Classified) 2.7%
9	Beta Blockers (Including All Propranolol Cases) 2.5%	Buprenorphine 2.5%	Diphenhydramine Alone (Unknown if OTC or Rx) 2.8%	Valproic Acid 2.3%	Antihistamine and/ or Decongestant with Dextromethorphan without Phenylpropranolamine 2.4%
10	Oral Hypoglycemics: Sulfonylureas 2.3%	Antihypertensives (Excluding Diuretics) 2.1%	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 2.4%	Acetaminophen Alone 2.2%	Methylphenidate 2.4%

Missing age=4

*Out of 594,379 case records for unintentional-general and unintentional-therapeutic error.

**Acetaminophen alone includes pediatric, adult, and unknown if pediatric or adult. This facilitates comparison to other general categories of medicine on the list.

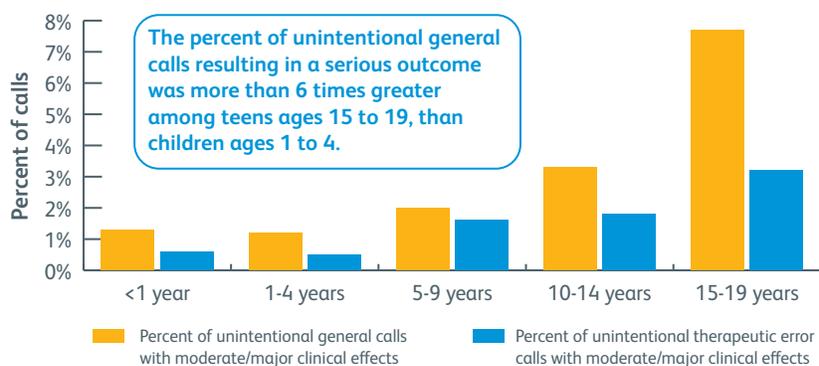
Teenagers: Serious Effects

While calls to poison centers for young children have fallen in the last five years, we haven't seen the same progress among older children and teens. This is especially apparent when looking at the cases with the most serious effects.

While children ages 1 to 4 made up the majority of unintentional-general and therapeutic error calls for children, the greatest percentage of calls with moderate or major effects was among teenagers ages 15 to 19 (Figure 5).

In 2013, there were 3,953 unintentional-general calls for teens ages 15 to 19, and of those, 8 percent resulted in serious effects. The percent of unintentional-general calls resulting in moderate or major effects was more than 6-times higher among teenagers ages 15 to 19, than children ages 1 to 4. A similar pattern can be seen among the unintentional-therapeutic error calls; 3 percent of the 10,229 therapeutic error calls for teens resulted in moderate or major effects, compared to 0.5 percent of calls for children ages 1 to 4.

Figure 5. Percent of unintentional-general & therapeutic error medicine exposure calls with moderate/major clinical effects, by age group, 2013



The top medicine involved in unintentional therapeutic error calls for children ages 5 to 9, 10 to 14, and 15 to 19 was “other antihistamines alone, excluding cough and cold preparations” (Table 3). This includes medicines like fexofenadine (Allegra) and loratadine (Claritin). Prescription medicines such as antibiotics, stimulants and antihypertensives made the top ten list for therapeutic errors for children ages 10 and older, in addition to pain relievers and cough and cold medicines.

Methylphenidate, a medicine used to treat attention deficit hyperactivity disorder (ADHD), ranked #2 for therapeutic errors among children 10 to 14, and #6 for children 15 to 19. In the U.S., approximately 10 million prescriptions are written for children for methylphenidate every year.¹² Symptoms from taking too much can include agitation, faster heart rate, and high blood pressure.¹² A study of Dutch poison center calls about methylphenidate found that young children most often got into methylphenidate that belonged to a sibling.¹²

We also learned that methylphenidate ranked high in the unintentional calls resulting in serious effects: #8 for children under 1 year; #4 for children 5 to 9 years and children 10 to 14; and #10 for children 15 to 19 (Table 2).

While we didn't look at cases where the child or teen purposefully misused or abused a medicine, it's interesting to note that medicines to treat ADHD are the types of medicine most often misused by teens: a national survey of 12th grade students found that after marijuana, the most often misused drugs taken without a doctor's prescription were amphetamines (8.1 percent) and Adderall (6.8 percent).^{13,14} It is concerning that medicines like methylphenidate and amphetamines rank so highly in the numbers of unintentional-therapeutic errors and serious effects resulting from unintentional exposures. It points to a need to educate about the potential dangers of taking medicines without a doctor's prescription, and to remind families of how to take medicine safely by always reading and following the medicine label, and by coordinating dosing between caregivers.

This is just one example of how medicine intended to help those who need it can cause serious health issues in children and teens when taken unintentionally, taken in the wrong dose, or used without a doctor's prescription. Education should start at an early age. Make sure that pre-teens and teens know that using over-the-counter and prescription medicines incorrectly can cause harm, and teach them how to read an over-the-counter drug facts or prescription label. Check in with them about the medicine they take regularly to ensure they are administering the correct dose. One resource for parents, educators and nurses to help teach pre-teens and teens about taking medicine safely is OTC Literacy, which can be found at <http://www.scholastic.com/otcliteracy/>.

Table 3. Top Ten Products in Unintentional-Therapeutic Error Exposures by Age Group, 2013

	<1 year (n=15,224)	1-4 years (n=37,817)	5-9 years (n=31,556)	10-14 years (n=20,156)	15-19 years (n=12,987)
1	Acetaminophen Alone 26.7%	Ibuprofen 17.0%	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 11.6%	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 10.7%	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 6.9%
2	Ibuprofen 15.3%	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 11.3%	Ibuprofen 7.1%	Methylphenidate 8.4%	Ibuprofen 5.4%
3	Cimetidine and Other Histamine-2 Blockers 9.6%	Acetaminophen Alone 10.8%	Systemic Antibiotic Preparations 6.2%	Amphetamines and Related Compounds 5.8%	Atypical Antipsychotics 4.8%
4	Systemic Antibiotic Preparations 7.9%	Systemic Antibiotic Preparations 10.5%	Methylphenidate 6.1%	Ibuprofen 4.9%	Acetaminophen Alone 4.3%
5	Other Types of Gastrointestinal Preparation 5.7%	Diphenhydramine Alone (Unknown if OTC or Rx) 5.1%	Acetaminophen Alone 5.3%	Acetaminophen Alone 4.0%	Systemic Antibiotic Preparations 3.7%
6	Other Antihistamines Alone (Excluding Cough and Cold Preparations) 3.5%	Antihistamine and/ or Decongestant with Dextromethorphan without Phenylpropranolamine 4.5%	Dextromethorphan Preparations (Not Otherwise Classified) 4.3%	Atypical Antipsychotics 4.0%	Methylphenidate 3.5%
7	Antacids: Proton Pump Inhibitors 2.2%	Dextromethorphan Preparations (Not Otherwise Classified) 3.9%	Amphetamines and Related Compounds 4.0%	Antihypertensives (Excluding Diuretics) 3.7%	Amphetamines and Related Compounds 3.5%
8	Vitamin D 1.9%	Diphenhydramine Alone (Over the Counter) 3.4%	Antihistamine and/ or Decongestant with Dextromethorphan without Phenylpropranolamine 3.3%	Systemic Antibiotic Preparations 3.2%	Acetaminophen and Dextromethorphan Combinations with Decongestant and/or Antihistamine without Phenylpropranolamine 2.9%
9	Multiple Vitamins 1.9%	Antihistamine and/or Decongestant without Phenylpropranolamine and Opioid 2.6%	Diphenhydramine Alone (Unknown if OTC or Rx) 3.2%	Clonidine 3.1%	Antihistamine and/or Decongestant without Phenylpropranolamine and Opioid 2.3%
10	Diphenhydramine Alone (Unknown if OTC or Rx) 1.8%	Multiple Vitamins 2.6%	Antihypertensives (Excluding Diuretics) 3.1%	Diphenhydramine Alone (Unknown if OTC or Rx) 2.4%	Naproxen 2.2%

Missing age=220

*Out of 594,379 case records for unintentional-general and unintentional-therapeutic error.

**Acetaminophen alone includes pediatric, adult, and unknown if pediatric or adult. This facilitates comparison to other general categories of medicine on the list.

***Multiple vitamins includes pediatric and adult formulations, in tablets and liquids, and unspecified multiple vitamins

When and Where Does it Happen?

We also looked at when and where children were exposed to medicine. In 2013, the greatest number of average daily unintentional-general and therapeutic error calls for medicine was in January with 1,638 calls per day, or 50,765 calls for the month (Figure 6). The lowest number of average daily calls was in July at 1,392 calls per day, or 43,166 calls for the month.

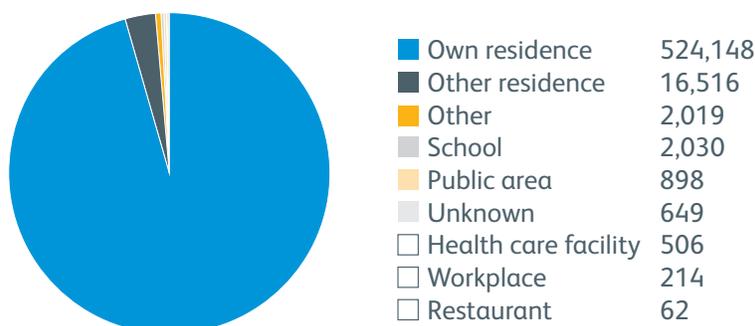
Figure 6. Average number of daily unintentional-general & therapeutic error calls for medicine, by month, 2013



While fewer children got into medicine or were given too much medicine during the summer months, other poisons can pose a risk in the summertime. A study found that the highest incidence of young children exposed to hydrocarbons such as lamp oil, lighter fluid, and gasoline, happened in the summertime.¹⁵

Next, we looked at where children got into medicine. Among the cases we looked at, the top location where children got into medicine or got too much medicine was in their own home (96 percent) (Figure 7). This was true even of older children; 94 percent of teens ages 15 to 19 were exposed at their own home. Some children were exposed at someone else's home (3 percent) or school (0.4 percent). However, this finding doesn't tell us whose medicine was taken—for example, a visitor to the home could leave medicine on the bathroom counter, where children could easily take it. In 2013 research from Safe Kids, we found that in 43 percent of emergency department visits resulting from young children getting into medicine, the medicine belonged to a grandparent, aunt, or uncle.³ Remind and offer to help visiting family members, babysitters and houseguests to keep purses and bags that might contain medicine up and away when they visit your home.

Figure 7. Exposure site for unintentional-general & therapeutic error calls for medicine, children 19 and under



Every parent and caregiver can help demonstrate responsible medication behavior. Keeping medicine in a secured place, helping your child understand the label before taking medicine, and communicating the importance of only taking medication meant for them are key steps in keeping children and teens safe around medicine. For more information about medicine safety, visit <http://www.safekids.org/medicinesafety>.



Spotlight on Specialists in Poison Information

We interviewed several Certified Specialists in Poison Information, or “CSPIs.” CSPIs answer calls at the 55 poison centers around the US. Here is what they had to say about the work they do and what they want parents to know about poison centers.

Pamela Chase RN, CSPI
West Virginia Poison Center
17 years at poison center

Erin Pallasch PharmD, CSPI
Illinois Poison Center
18 years at poison center

George Layton MD, CSPI
South Texas Poison Center
11 years at poison center

Cheri Wessels BSN, MBA, RN, CSPI
Tennessee Poison Control Center
20 years at poison center

Lynn Ballentine BSN, CSPI
Indiana Poison Center
25 years at poison center

Pela Soto PharmD, CSPI
National Capital Poison Center
3 years at poison center

Ben Tsutaoka, PharmD, DABAT, CSPI
California Poison Control System, San Francisco Division
15 years at poison center

Kristie Williams, PharmD, CSPI
Oklahoma Center for Poison & Drug Information
3 years at poison center

Joan Gibson, RN, CSPI
Washington Poison Center
27 years at poison center

Amanda Lynn RPh, CSPI
Washington Poison Center
7 years at poison center

Randy Badillo, RN, BSN, CSPI
Oklahoma Center for Poison and Drug Information
13 years at poison center

Gilbert Smith MD, CSPI
Florida Poison Information Center-Tampa
6 years at poison center

Marina Hradil RPh, CSPI
Washington Poison Center
8 years at poison center

What’s it like to be a CSPI?

CSPIs answer the Poison Help line in shifts to ensure that calls are answered 24/7, 365 days a year. When we asked them what it’s like to be a CSPI, many commented on how much specialized training is required. “Becoming a CSPI took many years of education—first by becoming a licensed health care professional, then learning the intricacies of toxicology, the study of the effects of poisons on the body,” said Marina. Gilbert added, “It’s not easy to become a CSPI. You must have a strong medical background, learn toxicology, pass the certification exam, and be able to work in a high stress environment.”

Several specialists also remarked about how rewarding it is to work at a poison center. “My job puts me on the front lines of emergency poisonings, assisting families and hospitals when they call in,” said Gilbert. Amanda added, “Every day, it is incredibly fulfilling to be able to reassure and guide parents who call the poison center frightened that their child may be poisoned.”

Why do we need poison centers?

Our group of specialists was quick to emphasize that in addition to saving lives, poison centers save both callers and the health care system time and money. “Poison centers are cost effective and save millions of health care dollars each year for their communities,” said Pela. Ben added, “Health care providers like the family doctor often tell their patients to call the poison center anyway because we are the poison experts. A call to the poison center will save you time.”

Also, poison centers play a crucial role in the health care system. Cheri explains, “Without poison centers, emergency rooms would become overcrowded with poison exposure patients, most of whom do not actually need emergency treatment.” Joan points out that “poison centers specialize in toxicology, allowing emergency room physicians to concentrate on their emergencies and seek our help where appropriate; they allow pediatricians to attend to the health issues of their young patients and yet have experts to turn to when a patient ingests his bottle of antibiotic, vitamins, bath bubbles, or a parent’s medication.” Kristie adds, “Healthcare professionals have come to rely on the poison centers for treatment advice when a patient presents to the emergency department or intensive care unit after they have been exposed to a poison, medication, or chemical.” In fact, in 2013 well over 400,000 of the exposure calls made to poison centers were made from a health care facility such as a doctor’s office, urgent care clinic, or emergency department.

What do CSPIs want parents to know about calling the poison center?

Often parents are worried about calling the poison center because they are concerned about what the person on the other end of the phone will think about them. “I wish that all parents knew that they are not ‘bad parents’ because their child got into something. Many of us have children ourselves. We understand that children are curious and we are not here to judge,” explains Pela.

“Besides our knowledge about poisons, we know about your child’s inquisitive nature and we understand that kids can get into everything,” says George. Pam adds, “It doesn’t matter how many times they have called in the past and we are well aware that there are those curious kids out there that seem to be able to scale every barrier and undo every child safety lock!” Erin wants you to know that “being proactive and calling for an expert opinion proves that you are a great parent.” “There is no such thing as a silly question. Every caller and call is important to us,” summarizes Lynn.

Cheri says, “If possible, when you call it’s best to stay calm and have available the age, weight, and medical history of the person involved, the name and amount of the substance, the symptoms the person is having, any treatments already given and the approximate time the exposure occurred.” Ben explains, “We need to ask a lot of questions so that we can evaluate each situation and make appropriate treatment recommendations.” This is why it’s so important to keep potential poisons and medications in their original containers. “It has been my experience that knowing exactly what I’m dealing with helps expedite the care of the patient,” adds Randy.

If you were able to give one poison prevention message what would it be?

Several CSPIs commented on child-resistant packaging. “Child resistant caps are NOT childproof, for it only takes a little persistence to open these containers,” says Cheri. Pela adds, “My own child opened an allergy medicine bottle at about 7 months old!”

Ben’s prevention message is “Please make sure that medications that are in your home or that come into your home (i.e. with grandparents) are kept up, away, and out of sight, preferably in a locked container. The most serious calls to poison centers involve medications. Making sure they are inaccessible is the key to prevention.”

Kristie’s tip is, “Program the Poison Help number into your cell phone and call first for your poison and medication-related questions and emergencies.”

Marina’s prevention motto is, “‘If in doubt, put it out.’ Put items that you are not sure of out of sight and out of reach of children. But remember that sometimes, no matter how much we prepare, the unexpected happens. That is why there are poison centers.”



Join Us in Supporting Full Funding for Poison Centers

Federal Investment in Poison Control. As advocates for child safety solutions, Safe Kids views poison centers as an indispensable and effective part of our health care system. We believe it is vital that the federal government make a meaningful investment in them.

A Tiny Fraction of the Federal Budget. It costs just \$136 million annually to run our nation's network of 55 poison centers, and the federal government contributes less than 15 percent to continue their operations. In 2014, Congress passed a law which said that poison centers should receive \$28.6 million.¹⁶ However, for each of the last two years, Congress provided only \$18.8 million.¹⁷ That's .00047 percent of the \$3.99 trillion federal budget or 4 ten-thousandths of 1 percent.

The poison center network is a mix of independent non-profits, extensions of regional health care systems, or part of public health departments or universities. They are funded by a variety of sources. In addition to the small amount of federal funding, \$83.8 million comes from their respective states and \$35.1 from private sources such as hospitals.¹⁸

The economic return on investment is high— \$1.8 billion in costs are saved each year because people were able to avoid going to health care facilities by making a free call for fast, accurate information.¹⁸ For every dollar invested in the system—by all funding sources—there is a savings of \$13.39,¹⁸ with a significant amount of money saved involving federal programs such as Medicaid.

Need Justifies the Funding

More than ever, a strong, diverse poison center system is an essential partner in the \$3.8 trillion U.S health care system. The following are just some of the reasons:

- **Number One Killer:** Poisoning is the leading cause of injury death in the U.S. for all ages.¹⁹ In 2013, poison centers answered more than 1.34 million calls for children 19 and under.¹ Kids 1 and 2 years old account for 53 percent of medicine-related calls to poison centers and poisoning is a leading cause of nonfatal injuries treated in hospital EDs in 7 out of 10 age groups.²⁰
- **Assisting Health Care Professionals:** More than 20 percent (400,000) of the 3.1 million calls poison centers receive are from hospitals and health care providers about patient emergencies because they are the nation's experts on poisoning.¹⁸ The men and women who answer poison center phones are health care professionals themselves, required to have an advanced, clinical degree in toxicology, medicine, nursing or pharmacy.¹⁸
- **Emerging Risks Always Emerging:** New products, innovations in product packaging, food contaminations, new medications and their side effects are constantly challenging poison center experts. They must continually build their knowledge base and expertise. In addition, drugs that unfortunately become popular to teens are always changing and sometimes reasserting themselves as public health dangers.
- **Diverse System:** One of the reasons why the U.S. network of 55 poison centers is so effective is because many of them develop a special expertise which they share with each other. For example, what if a poisonous widow spider indigenous to Colorado ends up in the suitcase of a New Jersey resident and bites a child? The New Jersey poison center will be able to deal with it because of the expertise of the Rocky Mountain Poison Center.
- **Disaster and Public Health Emergencies:** Poison centers play a crucial role in the public health response during outbreaks, oil and chemical spills and water supply contamination.

What Can You Do?

We cannot allow the poison centers to be weakened so that when a parent calls 800-222-1222 the phone keeps ringing. You can join us in the effort to keep poison centers strong by asking your Members of Congress and Senators to provide the full amount Congress should receive in federal law for the poison center network. To take action, visit www.safekids.org/poison-centers.



How to Work With Your Local Poison Center to Reduce Medicine Poisoning: An Example from Kentucky

Safe Kids coalitions across the country join with local experts to enhance the quality of the injury prevention programs delivered in their communities. One important partner in the effort to keep children safe around medicine is poison centers. As Safe Kids Fayette County has found, poison centers can be invaluable resources for both data and educational information.

Safe Kids Fayette County is based in Lexington, Kentucky, and is led by Kentucky Children’s Hospital. The coalition was established in 1993, and since its early years, they have used data and resources provided through the Kentucky Regional Poison Control Center as a part of their efforts to address injury risks related to poisonings.

The information and resources made available through the Kentucky Regional Poison Control Center helps to guide the coalition’s poison prevention initiatives. In particular, the coalition refers to the poison center’s resources whenever poison prevention is a topic in their community programs. According to Sherri Hannan, RN, the program coordinator for Safe Kids Fayette County, “Kentucky Regional Poison Control Center is the poison expert, so we rely heavily on their expert knowledge, referencing their data and using their educational materials, teaching tools, and resources.”

How can Safe Kids coalitions work more closely with poison centers? “If there is a poison center near your coalition, take the time to connect with their center educator,” says Sherri. “A partnership will help build or enhance your poison prevention efforts.”

Methodology

The American Association of Poison Control Centers' National Poison Data System (NPDS) is a near real-time database of poisoning exposure and information calls. As of January 1, 2013, 57 poison centers covering the entire population of the United States uploaded data to NPDS. The poisoning database contains more than 400,000 different products, which was organized into generic categories. The pharmaceutical group includes 519 generic medicine categories.¹

For this report, we analyzed NPDS case listings of unintentional-general pharmaceutical ingestions and unintentional-therapeutic errors for children ages 19 and under in 2013, where at least one product involved was medicine and at least one route of exposure was ingestion. Variables of interest included general substance category, patient age, gender, exposure location, scenario, and outcome. We analyzed the data using descriptive statistics using Stata/IC 13.

NPDS data only reflects cases captured when people call poison centers and should not be used to make national poison exposure generalizations. NPDS does not capture cases in which an exposed person went directly to the Emergency Department or called 911 instead of calling a poison center, unless the health care provider called on his or her behalf.



Glossary

Reason

Unintentional-general: Unintended exposure resulting from an unforeseen or unplanned event. Examples: child got into a grandparent's prescription medicine; swallowed medicine left out on a counter.

Unintentional-therapeutic error: An unintended change in a therapeutic routine that results in the wrong dose, the wrong medicine, or medicine given to the wrong person. Example: Babysitter gave a child a second dose of medicine, when the parent had already given it.

Medical outcome

No effect: No symptoms resulted from the exposure.

Minor effect: Patient experienced some symptoms from the exposure, but didn't have long-lasting problems. Examples: skin irritation, drowsiness, mild stomach symptoms.

Moderate effect: Patient experienced more pronounced or prolonged effects that resolved and that were not life-threatening. Examples: disorientation, high fever, isolated brief seizures that responded to treatment.

Major effect: Life-threatening symptoms or symptoms that caused significant permanent health issues. Examples: cardiac arrest or respiratory arrest, coma.

References

1. Mowry JB et al. 2013 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 31st Annual Report. *Clin Toxicol (Phila)*. 2014; 52:1032-1283.
2. "Healthy Children: Ages & Stages." HealthyChildren.org, from the American Academy of Pediatrics. Available at: <http://www.healthychildren.org/English/ages-stages/Pages/default.aspx>. Accessed March 6, 2015.
3. Ferguson RW, Mickalide AD. An In-Depth Look at Keeping Young Children Safe Around Medicine. Washington, D.C.: Safe Kids Worldwide, March 2013.
4. Mowry JB et al. 2012 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 30th Annual Report. *Clin Toxicol (Phila)*. 2013; 51:949-1229.
5. Bronstein AC et al. 2011 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 29th Annual Report. *Clin Toxicol (Phila)*. 2012; 50:911-1164.
6. Bronstein AC et al. 2010 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 28th Annual Report. *Clin Toxicol (Phila)*. 2011; 49:910-41.
7. Bronstein AC et al. 2009 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 27th Annual Report. *Clin Toxicol (Phila)*. 2010; 48:979-1178.
8. Smith MD et al. Out-of-hospital medication errors among young children in the United States, 2002-2012. *Pediatrics*. 2014; 134:867-76.
9. "Are Diaper Rash Products Dangerous?" The Poison Post, Spring 2011. Available at: <http://www.poison.org/poisonpost/spring2011/diaperrash.htm>. Accessed February 26, 2015.
10. "Multiple vitamin overdose." MedLine Plus, National Institutes of Health. Available at: <http://www.nlm.nih.gov/medlineplus/ency/article/002596.htm>. Accessed February 23, 2015.
11. Lovegrove MC et al. Emergency hospitalizations for unsupervised prescription medication ingestions by young children. *Pediatrics*. 2014; 134:e1009-16.
12. Hondebrink L et al. Methylphenidate intoxications in children and adults: exposure circumstances and evidence-based dose threshold for pre-hospital triage. *Clin Toxicol (Phila)*. 2015; 53:168-77.
13. "DrugFacts: Prescription and Over-the-Counter Medications. National Institute on Drug Abuse, National Institutes of Health. Available at: <http://www.drugabuse.gov/publications/drugfacts/prescription-over-counter-medications>. Accessed February 21, 2015.
14. Johnston LD et al. Monitoring the Future national survey results on drug use: 1975-2014: Overview, key findings on adolescent drug use. 2015. Ann Arbor: Institute for Social Research, The University of Michigan.
15. Jolliff HA. Pediatric hydrocarbon-related injuries in the United States: 2000-2009. *Pediatrics*. 2013; 131:1139-47.
16. Center Network Act, PL 113-77, 01.24.2014, Available <https://www.congress.gov/bill/113th-congress/house-bill/3527/text?q=%7B%22search%22%3A%5B%22poison+control%22%5D%7D> Accessed March 2, 2015.
17. Consolidated Appropriations Act, 2014, PL 113-76, 01/17/2014 Available <https://www.congress.gov/bill/113th-congress/house-bill/3547?q=%7B%22search%22%3A%5B%22consolidated+appropriations+act%2C+2014%22%5D%7D> Accessed March 12, 2015
18. Lewin Group, "Final Report on the Value of the Poison Center System," September 26, 2012 Available https://aapcc.s3.amazonaws.com/files/library/Value_of_the_Poison_Center_System_FINAL_9_26_2012_-_FINAL_FINAL_FINAL.pdf Accessed March 6, 2015. The \$1.8 billion number includes \$752.9 million per year due to avoided medical utilization and \$441.1 million per year due to reduced hospital length of stay.
19. Warner M, Chen LH, Makuc DM, Anderson RN, Miniño AM. Drug poisoning deaths in the United States, 1980-2008. *NCHS Data Brief*. 2011 Dec;(81):1-8 Available <http://www.cdc.gov/nchs/data/databriefs/db81.pdf> accessed March 6, 2015.
20. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web based Injury Statistics Query and Reporting System (WISQARS). National Center for Injury Prevention and Control Website. Leading Cause of Nonfatal Injury, 2013. Available from: <http://www.cdc.gov/injury/wisqars/index.html>. Accessed March 6, 2015.

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