

Safe Medicine Storage:

Recent Trends and Insights for Families and Health Educators

March 2018



WHAT TO KNOW ABOUT STORING MEDICINE

JUST ONE MINUTE

In ER visits for medicine poisonings, parents often say that they only turned their back for a minute.



CURIOUS CLIMBERS

Research indicates in about half of over-the-counter poisoning cases, the child climbed on a chair, toy or other object to reach medicine.



CHILD-RESISTANT ≠ CHILD-PROOF

Research suggests about half of accidental poisonings involved child-resistant packaging.





EVERY 9 MINUTES,

a young child (under age 6) goes to the ER because he/she got into medicine, and



EVERY HOUR,

a young child is hospitalized, and



EVERY 12 DAYS

a young child dies.



THE RISK IS REAL: HOW FAMILIES CAN HELP PROTECT KIDS

- Put all medicine up and away, out of children's reach and sight. Remember to keep visitors' purses, bags and coats out of reach, as they may contain medicine.
- Remember child-resistant packaging is not childproof. So put medicine away immediately after every use, even if you need to give another dose in a few hours.
- Save the Poison Help number 1-800-222-1222 in your phone and post it visibly at home so other caregivers can find it in an emergency.



Executive Summary

Every 12 days, a child under age 6 in the United States dies from an accidental medicine-related poisoning. Every hour, a child is hospitalized for that same reason, and every nine minutes, a child goes to the emergency room (ER). While the number of ER visits has decreased since an alarming peak in 2010, far too many children are still in danger because they get into medicine when their caregiver is not looking, underlining the need for ongoing education and awareness building.

Parents and caregivers remain the first line of defense in preventing these incidents, and their behavior is influenced by their knowledge and attitudes towards safe storage. Yet while most know to store medicine up and away, out of reach and sight, they don't always do so. This report updates current trends in medicine poisoning among children under age 6, uses the results of our most recent survey with parents to look at three common scenarios of children getting into medicine and explores factors associated with safestorage behavior.

Our research revealed that some parents are more likely to store medicine where kids can get to it. In particular, young parents – particularly those under age 24 – fathers and parents living in urban and suburban settings were more likely to report unsafe attitudes or behaviors related to the storage of medicine. These findings make it all the more important for public health educators, as well as other healthcare providers, such as physicians and pharmacists who interact with parents, to take active steps to educate parents on hazards and safe-storage behaviors.

The findings also underline the need to continue educational efforts to encourage parents to:

- Keep medicine stored out of reach and sight every time;
- Remember child-resistant packaging is not childproof. So put medicine away immediately after every use, even if you need to give another dose in a few hours;
- Use safe reminder tools to help you remember when to take and give medicine; and
- Save the Poison Help number 1-800-222-1222 in your phone and post it visibly at home.

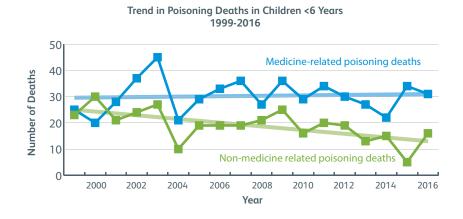


Are We Making Progress on Preventing Accidental Medicine Poisoning in Young Children?

In 2015, U.S. pharmacy and drugstore sales of prescription and over-the-counter medications amounted to about \$264 billion, a 40 percent increase in the last 10 years. It is estimated that in 2016, over 4.45 billion drug prescriptions were dispensed in the U.S. As the number of prescription and over-the-counter (OTC) medicines, vitamins and supplements continues to rise in households across the U.S., Safe Kids Worldwide examined existing data to explore the impact on children and whether we are making progress on preventing accidental medicine poisoning in young children.

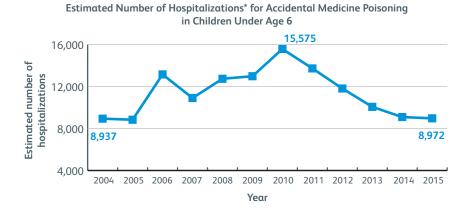
The answer is mixed. Sources of poisoning for child incidents in the home can be medicinal, such as prescription or OTC medicines, vitamins or supplements, or non-medicinal such as cleaning products, solvents or houseplants. While the annual number of deaths from poisoning in children under 6 years of age is small, medicine-related poisoning deaths have outnumbered non-medicine related poisoning deaths over the last 15 years (Figure 1). And while the trend in non-medicine-related poisoning deaths shows a slow decline since 1999, the trend for medicine-related fatalities has increased slightly. This divergence is interesting given that the advice to parents is similar for the prevention of both medicine and non-medicine poisonings and the number of both medicine and non-medicine sources of poisoning have increased in homes over time. While the flat trend in medicine-related poisoning deaths in light of increased exposure may suggest we are making progress in prevention, a child under age 6 still died every 12 days in 2016 as a result of an unintentional exposure to a medicine.

Figure 1. Every 12 days a child under age 6 dies because of an accidental medicine poisoning⁴



When we look at the trend in hospital care for accidental medicine exposures, we find a 42 percent decrease in the estimated number of hospitalizations between 2010 and 2015, suggesting that education and prevention efforts are having a positive impact. While this likely represents fewer serious medicine exposures requiring observation or treatment, it may also reflect changing admission practices (Figure 2). However, the recent downward trend has slowed in the most recent year of data available, going from a 10 percent decrease between 2013 and 2014 to a 1 percent decrease between 2014 and 2015. So, while the good news is that there has been progress, we still see a child under age 6 hospitalized every hour as a result of an accidental medicine poisoning.

Figure 2. Every hour a child under age 6 is hospitalized because of an accidental medicine poisoning 6

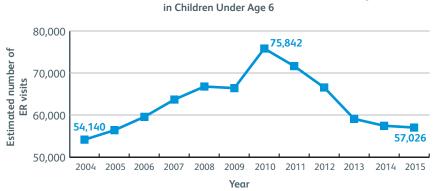


^{*}Hospitalizations include inpatient admissions, transfers to other facilities and observation admissions.

Providing further reason for optimism, the estimated number of emergency room visits has also significantly decreased in the last five years (Figure 3).⁷⁻⁸ Yet despite an overall decrease of 25 percent since peaking in 2010, the downward trend has slowed from an 11 percent decrease between 2011 and 2012 to a less than 1 percent decrease between 2014 and 2015. So, while there is evidence that educational efforts are likely having the desired impact, a child under age 6 still visits an ER every nine minutes.⁷⁻⁸

Figure 3. Every nine minutes a child under age 6 visits an ER because of an accidental medicine poisoning⁷⁻⁸

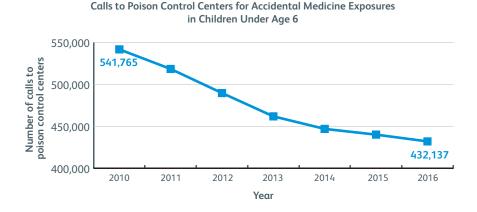
Estimated Number of ER Visits for Accidental Medicine Poisoning



Finally, when calls to poison control centers are examined, we find a 20 percent reduction in the number of calls for accidental medicine exposures in children under age 6 between 2010 and 2016 – but again, the trend has slowed between 2013 and 2016 (Figure 4).^{3,9} While this decrease is consistent with decreases in ER visits, the American Association of Poison Control Centers (AAPCC) has indicated it is not sure how much of the decrease represents a real reduction in exposures.¹⁰

At the same time that calls from parents are decreasing, the call volume coming from healthcare providers is increasing alongside the complexity and severity of their caseload. The AAPCC has suggested that there are several potential reasons for the decline in poison control call volume from parents and caregivers. They include a decreasing birth rate, resulting in fewer kids to call about, and a decrease in awareness of poison control centers. There may also be a conflict between modes of reaching poison control centers: traditional telephone calls versus newer consumer education preferences such as chatting, texting and web searching for minor poison exposures. Regardless, poison control centers still receive about 49 calls per hour because a child under age 6 got into medicine.

Figure 4. Poison control centers receive about 49 calls per hour for accidental medicine exposures in children under age 69



So, while there are some encouraging trends in accidental medicine poisoning, particularly given that there is more medicine in today's home than ever before, the number of children showing up in the healthcare system because of an accidental exposure to medicine remains unacceptable. Today, for every fatal exposure, there are an estimated 289 hospitalizations, 1,840 ER visits and 13,940 calls to poison control centers. This clearly supports the need to continue educational efforts with parents. Further, given that trends toward decreasing numbers have slowed considerably in the last two years, we may also need to explore additional strategies and expand work with sources of credible information such as healthcare providers and pharmacists to ensure parents are reached with important preventive information.

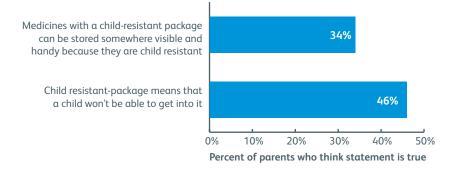
How Can We Better Target Prevention Efforts to Prevent Accidental Medicine Poisoning in Young Children?

To better target prevention efforts, Safe Kids Worldwide undertook a more detailed analysis of the results of a 2017 survey of 2,000 parents of children under age 6, which examined their knowledge, attitudes and behavior related to accidental medicine poisonings. We looked at factors associated with knowledge around child-resistant packaging, the attitude that supervision is enough to keep kids safe from medicine poisoning and safe-storage behavior. Variables examined included parent gender and age, education level, household income, number of children, community setting (parents self-selected as urban, suburban, rural) and behavior, knowledge and attitude scores. We report those factors that were statistically significant at a p<0.05 level.

Child Resistant Does Not Mean Childproof

Some parents are confused about what child resistant means. Child-resistant packaging does not mean it is childproof; it means that the packaging meets a standard that requires it to be "significantly difficult for children under five years of age to open within a reasonable time, and not difficult for normal adults to use properly." In our initial analysis, almost half of parents surveyed incorrectly believed that child-resistant packaging means a child won't be able to get into it at all, and 1 in 3 agreed that medicine in child-resistant packages can be safely stored somewhere visible and handy (Figure 5). This is concerning given that research suggests that 45 to 55 percent of accidental medicine poisonings involve child-resistant packaging. 13-15

Figure 5. Parents overestimate the protection provided by child-resistant packaging



We found that mothers were 1.7 times as likely as fathers to understand what child resistant means. We also found that younger parents under age 24 were less likely to understand what child resistant means, with parents ages 36 or older more than twice as likely to correctly answer that child-resistant packaging does not mean a child will not be able to get into it. Asian parents were also less likely to answer correctly compared to Caucasian parents. No other racial differences were found.



Child-resistant packaging is not childproof.

We found that parents living in rural areas were more than twice as likely to correctly answer the questions around child-resistant packaging than parents in urban settings, and 1.3 times more likely to correctly answer than parents in suburban settings. Finally, while household income was not associated with correctly identifying that child resistant does not mean childproof, it was associated with knowledge around correctly storing child-resistant containers. Parents reporting a household income less than \$50,000 were more likely to correctly identify that it is not safe to store child-resistant containers somewhere visible and handy than parents with higher household incomes.

Supervision is Not Enough

The results of our survey indicate that 1 in 3 parents believe that as long as a child is being watched, it doesn't matter as much where medicine is stored. Yet other research suggests that many parents overestimate their child's ability to understand the potential dangers and follow safety rules, so supervision alone won't protect against medicine poisoning. This is illustrated by parents who, upon presenting to ER, indicate that they turned their back for "only a minute" when their child got into medicine. The same parents who in the results of the same parents who in the results of the same parents who is a same parents who is



In our survey, mothers were 1.3 times more likely to disagree with this attitude than fathers. A similar age gradient was found with older parents, who were more likely to disagree with the statement than parents under age 24.

Parents with two children were also more likely to disagree with the statement than parents with a single child, suggesting they recognize that supervising more than one child may increase the risk. Asian parents were 1.8 times more likely to agree with the statement compared to Caucasian parents. No other racial differences were found. Finally, parents living in rural areas were more likely to disagree that supervision is enough than parents in either urban or suburban areas.

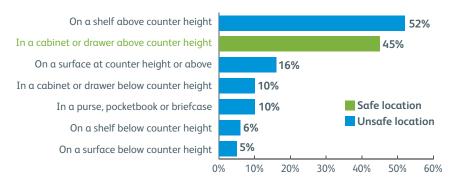
Beware the Curious Climber

Sometimes the only way a parent knows a child has moved to a new level of development is when that child shows them through his or her behavior. A mother won't realize that her son can climb on top of a chair or even push it across the room until that first time he actually does so. Because development can be so rapid, we recommend that parents start practicing safe storage and keep medicine out of reach and sight after every use from day one.

In our initial analysis, we found that while 9 in 10 parents agree that "it is important to store medicine out of sight and up high after every use", nearly 7 in 10 parents admitted to storing medicine within a child's sight, such as on a shelf or surface at or above counter height (Figure 6).¹¹ Yet research suggests that about half of OTC poisoning cases involve a child climbing to reach medicine, meaning that out of reach is not enough: Medicine needs to be stored out of sight as well.¹⁸

We also found that while a majority of parents surveyed knew to store medicine out of reach and sight, 4 in 10 agree that it is okay to keep medicine that is going to be taken every day on the kitchen counter or in another visible location so it is handy. And nearly 5 in 10 parents agreed it is okay to keep the medicine on the kitchen counter or in another visible location between doses when a child is sick so that it is handy. These exceptions parents make are important, as research indicates that a majority of medicine poisonings occur when the medicine was not in its "normal" storage location.

Figure 6. The majority of parents store medicine in at least one location where it is either in reach or in sight



When we examined which factors were associated with safe storage in a location both out of reach and sight, we found that parents with higher attitude scores – meaning attitudes supporting safe storage – were slightly more likely to report safe storage. No difference was found with overall knowledge scores. However, parents who correctly said that the statement "medicine with child-resistant packages can be stored somewhere visible and handy because they are child resistant" was false, were 1.3 times more likely to safely store medicine than parents who thought the statement was true.



Parents with two children were also more likely to store medicine safely compared to parents with one child. This may reflect increasing experience with subsequent children or that parents recognize that they may get more distracted and less able to provide vigilant supervision and therefore take more care to ensure safe storage with two children.

Parents living in urban areas were less likely to report safe storage of medicine and frequently used medicine compared to parents living in rural areas.

While the factors associated with safe storage of frequently used medicine were similar to those associated with overall safe storage, we did find some differences. Parents with higher attitude scores were again more likely to report safe storage of frequently used medicine compared to those with lower scores. However, for safe storage of frequently used medicine, higher knowledge scores also increased the likelihood of safe storage.

There was no difference in safe storage of frequently used medicine by number of children, but parents ages 24-35 were 1.6 times more likely to safely store medicine compared to young parents under age 24. There was no significant difference between parents ages 36 and older and parents under age 24.

Finally, community setting was also associated with safe storage of frequently used medicine, with a similar finding of rural parents being more likely to report safe storage than parents in urban settings.

Insights for Health Educators

Overall, our findings suggest the need for ongoing education efforts among parents and caregivers regarding the risks for accidental medicine poisoning in young children. While decreasing trends suggest that we are making important inroads with educational efforts, there are still far too many young children entering the healthcare system as a result of an accidental exposure to medicine. The results of our in-depth analysis of factors associated with safe storage suggests that opportunities to interact with and educate fathers and younger, less-experienced parents may be warranted, as well as focused efforts in reaching parents in urban and suburban settings where safe storage behavior was found to be less frequent.

While increased risk of home injuries such as poisonings in children of young parents has been previously reported in the literature, ²⁰⁻²¹ the differences in attitudes, knowledge and safe-storage behavior by community setting has not. We found one study looking at geographic distribution of calls to poison control centers in Western Pennsylvania for unintentional exposure to medicine in children. That study found more calls from parents in urban areas than from rural areas, which the authors suggested was possibly due to greater knowledge of poison-control-center services. ²² We found that urban parents were 1.6 times more likely to have the Poison Help number stored in their phone or in a visible location in their home compared to rural parents, which supports the previous research finding.

In line with many behavioral models, we found that parents with attitudes that supported safe storage were more likely to practice safe storage overall and for frequently used medicine, but attitude score itself was not associated with community setting. Knowledge score was associated with community setting in that both urban and suburban parents had significantly lower knowledge scores than rural parents. Further, on the specific items examining child-resistant packaging and safe storage, parents living in rural areas were more than twice as likely to correctly answer the questions than parents in urban settings and 1.3 times more likely to correctly answer than parents in suburban settings.

Possible explanations for the differences by community setting might include:

- Higher levels of understanding of child-resistant packaging may lead to rural parents taking greater precautions regarding safe storage than parents in urban and suburban settings.
- Rural parents may also be more cautious than their urban and suburban counterparts given travel distances for treatment in the event of an accidental exposure, and therefore pay more attention to educational efforts and take greater precautions with storage.
- Families living in rural areas may only have one healthcare practitioner as opposed to urban and suburban areas, where families may have multiple practitioners. Fewer practitioners may mean fewer prescriptions or more consistent messaging around safe storage of medicine. We found that physicians and pharmacists are the source of information on medicine safety that parents are most likely to use.
- Finally, rural areas tend to be less densely populated, which may result in the availability of more health-education time per parent than those in more densely areas.

Further research is needed to confirm which, if any, of these possible explanations is correct, but regardless, learning why rural families have higher levels of knowledge and attitudes that support safe storage and are more likely to practice safe storage of medicine might provide insights for new impactful messaging and education for all families. Further investigation might also identify better ways to engage and teach parents living in urban areas.

We also need to further explore the impact of information sources on parent safe-storage behavior. We found that medical professionals were listed as the most common source of information, meaning that physicians and pharmacists can play an increased role in educating parents, grandparents and other caregivers of young children on the importance of safe storage, particularly in those groups least likely to report safe behavior. Public health educators should work to engage health care providers at the community level in educational efforts.

Simple Strategies for Parents

Our findings continue to provide support for continuing to promote safe storage of medicine by parents and caregivers of young children.

Store medicine up and away, out of children's reach and sight every time.

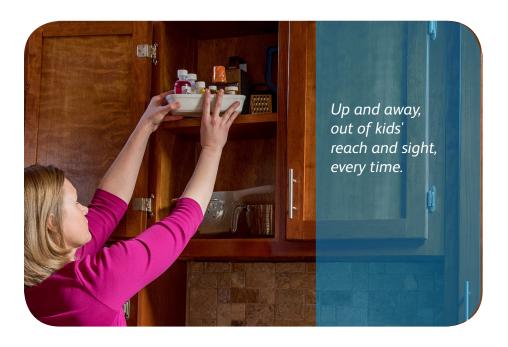
Store medicine safely by keeping it out of reach and out of sight, not one or the other. Medicine and vitamins should be stored out of sight in a cabinet or drawer, where children can't see them; and out of reach, at or above counter height. Remember to move items away from counters and cabinets that curious kids may climb on such as chairs, step stools or toys. Remember to also keep visitors' purses, bags and coats out of children's reach, as they may contain medicine.

Remember child-resistant packaging is not childproof. So put medicine away immediately after every use, even if you need to give another dose in a few hours.

Use safe reminder tools to help you remember when to take and give medicine.

- Set an alarm on your watch or cell phone.
- Write a note to yourself and leave it somewhere you look often, like on the refrigerator door.
- Combine taking daily medicine with a daily task, like brushing your teeth.

Save the Poison Help number – 1-800-222-1222 – in your phone and post it visibly at home. Our study found that more than 60 percent of parents reported not having the Poison Help number saved in their phone or posted at home. The Poison Help number connects you with specialists at poison centers who can answer questions about how to give or take medicine and help with poison emergencies





Methodology

Safe Kids Worldwide commissioned a national online survey of 2,000 parents with at least one child age 5 or younger. The survey, developed specifically for the study, included 36 closed-ended questions and was fielded from January 19 to 25, 2017 using Survey Sampling International's online adult panel. The margin of error for the sample size included for this study is 2.2 percent at a 95 percent confidence level.¹¹

For this report, four outcome variables were explored:

- 1. Attitude that as long as a child is being watched, it doesn't matter as much where medicine is stored (DISAGREE).
- 2. Knowledge regarding child-resistant containers a child-resistant package means that a child won't be able to get into it (FALSE) and medicines with child-resistant packages can be stored somewhere visible and handy because they are child resistant (FALSE)
- 3. Safe Storage of Medications ever storing medications in an unsafe place
- 4. Safe Storage of Medications that are used frequently ever storing medications that are used frequently in an unsafe place

In addition, an attitude score was created by summing across responses to 14 attitude items and a knowledge score was created by summing across 14 knowledge items. Bivariate associations were tested for each of the outcomes plus the knowledge and attitude scores and the demographic variables of interest and demographic variables were tested for collinearity using a Pearson Correlation Matrix. For each outcome variable of interest, a regression analysis was conducted selecting the demographic variables that had a bivariate association at the p<0.05 level. If both education and income were indicated for inclusion in the model, only income was used to avoid including collinear variables. Behavioral outcomes were modeled using logistic regression. Attitudes and knowledge were modeled using linear regression. Factors associated at a statistically significant level of p<0.05 are presented in this report; full regression models are available by contacting Safe Kids Worldwide at mmackay@safekids.org.

References

- U.S. Census Bureau. Annual Retail Trade Survey 2015 Pharmacy and drug store sales in the United States from 1992 to 2015. Available at https://www.statista.com/statistics/197635/annual-pharmacies-anddrug-store-sales-in-the-us-since-1992/ Accessed January 26, 2018.
- Quintiles IMS Institute. Medicines Use and Spending in the U.S.: A
 Review of 2016 and Outlook to 2021 Total number of medical
 prescriptions dispensed in the U.S. from 2009 to 2016. Available
 at: https://www.statista.com/statistics/238702/us-total-medicalprescriptions-issued/ Accessed January 26, 2018.
- MacKay JM, Steel A, Samuel E, Creppy T, Green A. The Rise of Medicine in the Home: Implications for Today's Children. Washington, D.C.: Safe Kids Worldwide, March 2016. Available at: https://www. safekids.org/file/3-17-16-skwmedicinesafetystudyforwebpdf Accessed January 26, 2018.
- 4. Centers for Disease Control and Prevention. National Center for Health Statistics. Compressed Mortality File 1979-1998 Archive and Compressed Mortality File 1999-2006. CDC WONDER Online Database. Available from: http://wonder.cdc.gov Accessed February 29, 2012 and Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online]. Accessed January 12, 2018. Available at: www.cdc.gov/injury/wisqars
- Bureau of Labor Statistics. Consumer Expenditure Survey 2016 –
 Average annual expenditure on laundry and cleaning products per
 consumer in the United States from 2007 to 2016; Average annual
 expenditure on other laundry and cleaning products per consumer
 in the United States from 2007 to 2016. Available from: https://
 www.statista.com/statistics/305499/us-expenditure-on-laundry-and cleaning-supplies/ Accessed: January 26, 2018.
- Centers for Disease Control and Prevention, Division of Healthcare Quality Promotion. Personal communication, January 19, 2018.
- Lovegrove M, Weilde NJ, Budnitz DS. Trends in Emergency Department Visits for Unsupervised Pediatric Medication Exposures, 2004-2013. Pediatrics 2015; 136(4):e821—e829; DOI: 10.1542/peds.2015-2092.
- Centers for Disease Control and Prevention, Division of Healthcare Quality Promotion. Personal communication, December 13, 2017.
- Gummin DD, Mowry JB, Spyker DA, Brooks DE, Fraser MO, Banner W. 2016 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 34rd Annual Report. Clinical Toxicology 2016; 55(10):1072-1254.
- American Association of Poison Control Centers. National Poison Data System. Personal communication. January 23, 2018.

- MacKay JM, Murphy K, Steel A. Safe Medicine Storage: A Look at the Disconnect Between Parent Knowledge and Behavior. Washington D.C.: Safe Kids Worldwide, March 2017. Available at: https://www.safekids.org/sites/default/files/medicine_safety_study_2017.pdf Accessed January 26, 2018.
- Poison Prevention Packaging Act. Available at: https://www.cpsc.gov/ Regulations-Laws--Standards/Statutes/Poison-Prevention-Packaging-Act/ Accessed January 26, 2018.
- McFee RB, Caraccio TR. "Hang Up Your Pocketbook" An Easy Intervention for the Granny Syndrome: Grandparents as a Risk Factor for Unintentional Pediatric Exposures to Pharmaceuticals. JAOA 2006; 106(7): 405-411.
- Franklin RL, Rodgers GB. Unintentional child poisonings treated in United States hospital emergency departments: national estimates of incident cases, population-based poisoning rates, and product involvement. Pediatrics. 2008 Dec;122(6):1244-51. doi: 10.1542/ peds.2007-3551.
- Bushby SK, Anderson RJ, Braund R. New Zealand parent's perceptions of the use and safety of over the counter liquid analgesics. Pharm Pract (Granada). 2010 Oct;8(4):238-42. Epub 2010 Mar 15.
- Schmertmann M, Williamson A, Black D. Unintentional poisoning in young children: does developmental stage predict the type of substance accessed and ingested? Child: care, health and development 2012;4(1):50-59.
- United States Consumer Product Safety Commission. National Electronic Injury Surveillance System. [Online]. Codes used: ages 0 to 5 years, all races, both sexes, year 2015, diagnosis 68; body part 85: Accessed January 12, 2017. Available from: http://www.cpsc.gov/en/ Research--Statistics/NEISS-Injury-Data/.
- Schoenewald S, Ross S, Bloom L, Shah M, Lynch J, Lin CL, Patel M, Boyle K, Kuffner E. New insights into root causes of pediatric accidental unsupervised ingestions of over-the-counter medications. Clin Toxicol (Phila). 2013;51(10):930-6. doi: 10.3109/15563650.2013.855314. Epub 2013 Nov 28.
- Wiseman HM, Guest K, Murray VSG, Volans GN. Accidental Poisoning in Childhood: A Multicenter Survey. 2. The Role of Packaging in Accidents Involving Medication. Human Toxicol 1987; 6:303-314.
- Laursen B, Nielsen JW. Influence of sociodemographic factors on the risk of unintentional home injuries. Eur J Public Health. 2008;18(4):366-370.
- 21. Crandall M, Sridharan L, Schermer C. Injury and health among toddlers to vulnerable families. J Trauma. 2010;68(5):1128-1133.
- Nguyen MB, Pizon F, Branas CC, Fabio A. Regional Variations in Pediatric Medication Exposure: Spatial Analysis of Poison Center Utilization in Western Pennsylvania. Clin Toxicol (Phila). 2016;54(1):47-52.

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Safe Kids Worldwide 1255 23rd Street, NW Suite 400 Washington, D.C. 20037 202.662.0600

www.safekids.org