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Characterization of Animal Exposure Calls Captured by the National Poison Data System, 2000–2010

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Abstract

Objective—Our objective was to characterize the data captured in all animal exposure calls reported to the National Poison Data System (NPDS), a national poison center reporting database, from 1 January 2000 through 31 December 2010 and identify Poison Center usage and needs in animal exposure calls.

Design—We calculated descriptive statistics characterizing animal type, exposure substance, medical outcome, year and month of call, caller location, and specific state for all animal exposure call data in NPDS from 1 January 2000 to 31 December 2010. SAS version 9.2 was used for the analysis.

Results—There were 1,371,095 animal exposure calls out of 28,925,496 (4.7%) total human and animal exposure calls in NPDS during the study period. The majority involved companion animal exposures with 88.0% canine exposures and 10.4% feline exposures. Pesticides were the most common exposure substance (n=360,375; 26.3%), followed by prescription drugs (n=261,543; 18.6%). The most common outcome reported was ‘Not followed, judged as nontoxic exposure or minimal clinical effects possible’ (n=803,491; 58.6%), followed by ‘Not followed, judged potentially toxic exposure’ (n=263,153; 19.2%). There were 5,388 deaths reported. Pesticide exposures were responsible for the greatest number of deaths (n=1,643; 30.4%).

Conclusions and clinical relevance—Approximately 1 in 20 calls to PCs are regarding potentially toxic exposures to animals, suggesting a need for veterinary expertise and resources at PCs. Pesticides are one of the greatest toxic exposure threats to animals, both in numbers of exposures and severity of clinical outcomes, and is an important area for education, prevention, and treatment.

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Introduction

Animal exposure to or ingestion of potentially toxic substances is one of the most common reasons for emergency visits to veterinary care providers [1]. Because of this, veterinary service providers must either develop expertise in veterinary toxicology or have access to toxicology expertise in order to respond to these potential emergencies. In the United States, veterinary curricula typically include basic toxicology and toxic emergencies as a part of core veterinary training. However, it may be difficult for an animal owner or veterinary care provider to properly respond to a potentially toxic exposure in an animal for several reasons [2]. New products and formulations are developed every year that may have different toxicologic properties in animals than previously seen. Additionally, species and even breeds differ in sensitivity and threshold for adverse health effects, further increasing the complexity of information with which a veterinary care provider must be knowledgeable [3–5]. Tus it can be difficult for a single provider to have adequate knowledge to respond to every toxic exposure encountered in practice. Having access to individuals with enhanced veterinary and toxicological expertise could increase the likelihood of a good outcome in animal poisoning and influence the course of action an animal owner may take following a toxic exposure.

Although the American Society for the Prevention of Cruelty to Animals (ASPCA) operates a specialized Animal Poison Control Center which houses veterinarians with expertise and training in toxicology, consultation requires a fee [6]. The ASPCA Animal Poison Control Center received approximately 167,000 calls in 2009. This service may be cost prohibitive for some animal owners, especially in potential cases of acute poisoning, in which animals have ingested a substance of unknown toxicity and the animal owners are uncertain of the potential consequences of the exposure. In these situations, owners might elect to wait for the onset of clinical signs before seeking fee-based advice or veterinary care, where an evaluation is not routinely done over the phone for liability reasons and also comes with a financial cost regardless of outcome. This delay in care-seeking may result in less optimal outcomes for the animal and an overall increased cost for care due to delayed treatment. Many pet owners and veterinarians are unaware of the fact that regional Poison Centers (PCs), typically used for human exposures, can also be used for guidance regarding potentially toxic exposures in animals [7].

In the United States (US), there is a system of regional poison centers (PCs) whose primary purpose is to provide medical advice, free of charge, for the public and healthcare practitioners with regard to managing toxic exposures in humans [8]. Poison centers may be accessed in the US, 24-hours a day seven days a week by calling a toll free number (800-222-1222). These centers serve the 50 states, American Samoa, the District of Columbia, Federated States of Micronesia, Guam, Puerto Rico, and the US Virgin Islands [9]. Calls are received and managed by healthcare professionals with specialized toxicology training and certification and include medical and clinical toxicologists, registered nurses, doctors of pharmacy, pharmacists, chemists, hazardous materials specialists, and epidemiologists. Individual PCs may have subject matter experts in other fields, such as mycologists, herpetologists and veterinarians, on call for consultation as needed, although this resource varies by center. Calls to PCs are broadly classified into exposure (a potential

exposure to a substance occurred) or informational (the caller is simply requesting information on a topic; no exposure occurred). Staff receiving calls triage and provide information to the caller about the risk of health effects, the need to seek medical treatment and how to manage exposures depending on what is needed. If the exposure is deemed to be either non-toxic or have a very low risk of causing adverse health effects callers may be reassured and persons may be managed at home, thus achieving a substantial cost saving for both the caller and the healthcare community [10–12]. If the exposure requires medical evaluation, the caller can be rapidly referred to a health care provider or hospital emergency department for further evaluation and treatment. If needed, toxicological expertise from the PC can be sought again, free of charge, by the healthcare provider evaluating the patient in a healthcare setting (clinic office, hospital, etc.). Data collected from these calls are recorded in a local server at the PC and a portion of the call data is uploaded in near-real time to a national database known as the National Poison Data System (NPDS), which is owned and operated by the American Association of Poison Control Centers (AAPCC) [8–9].

The objective of this study was to determine if PCs are used as a toxicological resource for hazardous exposures in animals. Our secondary objective was to determine where PCs and veterinarians should focus their staff educational efforts to optimize animal health.

Materials and Methods

We reviewed data on all calls captured by NPDS from 1 January 2000 to 31 December 2010. These calls represent reports from the general public, animal owners, and health care providers. We selected calls with an animal exposed to a potentially toxic substance, referred to as ‘animal exposure call’ as the reason for the call and further characterized these calls. We compared animal exposure calls to total human and animal calls to PCs both cumulatively, as well as by region. The state where the call originated was grouped by geographic region using the standard Environmental Protection Agency/Agency for Toxic Substances and Disease Registry regions. These regions include: 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont); 2(New Jersey, New York, Puerto Rico, US Virgin Islands); 3 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia); 4(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee); 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin); 6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas); 7 (Iowa, Kansas, Missouri, Nebraska); 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming); 9 (Arizona, California, Hawaii, Nevada, Other US territories and commonwealth); 10 (Alaska, Idaho, Oregon, Washington). Overseas US, Canada, Mexico, and other countries were included in a single category of “Outside US”.

Animal exposure calls were characterized by animal species or type, state, date and location of exposure, exposure substance, and medical outcome. Medical outcome is categorized by PC staff into no effect, minor effect possible, moderate effect possible, major effect possible, potentially toxic, not followed, and not followed judged potentially toxic based on the judgement of the PC staff. Due to the enormous number of different agents in NPDS, exposure substances were grouped into general categories and included: 1) household chemicals (art/craft/hobby supplies, automotive products, batteries, building and

construction materials, miscellaneous chemicals, and pool and aquarium chemicals), 2) cleaning substances (alcohols, deodorizers, essential oils, general cleaners), 3) Cosmetics (dental, hair, nail, personal care products), 4) other Chemicals (fumes/gases/vapors, heavy metals, fireworks/explosives, lacrimator chemicals, radiation, unknown substances), 5) paints and solvents, 6) food poisonings, 7) bites and envenomations, 8) foreign objects, 9) plants, 10) pesticides (rodenticides, insecticides, herbicides), 11) tobacco and nicotine, illegal drugs, non-steriodal anti-inflammatories (NSAIDS), 12) other over-the-counter medications (OTC), 13) supplements, 14) informational calls, and 15) prescription drugs. The frequency and percent of each medical outcome was calculated for each exposure substance category, as well as the most common exposure substance category for each species or animal type. Pesticide exposures were further characterized by sub-category for animal types and outcomes as prescribed by NPDS. The descriptive analysis was done using SAS version 9.2 (SAS Institute Inc., Cary, NC).

Results

From 1 January 2000 to 31 December 2010, a total of 1,403,434 calls about animals were reported to NPDS (Table 1). Of these, 1,371,095 were animal exposure calls and 32,339 (2.3%) were information calls (Table 1). The animal exposure calls accounted for 4.7% of all (human and animal) exposure calls (28,925,496) reported to NPDS during this 11-year period. The greatest number of animal exposure calls occurred in 2008, with 133,230 calls constituting 5.4% of all exposure calls during the 11-year period. Calls originating from outside the US had the greatest percentage of all calls with animal exposure as the reason for the call, at 8.9% (Table 2).

The greatest number of calls occurred annually in July with a seasonal distribution peaking in the summer months and the fewest calls received in February (Figure 1). The geographic region receiving the greatest number of calls was region 4, which received over 21% of all animal calls during the 11-year period and includes the southeastern states of Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee (Table 2). The majority of calls were for companion-animal exposures (dogs and cats), with 1,207,018 (88.0%) calls reporting canine exposures and 142,924 (10.4%) calls about feline exposures (Table 3). Information on age of animal (animal exposure calls only) was provided for 742,047 calls (54.1%). Of these, 647,349 (87.2%) were dogs. The median age for all animals in which data was available was 2.0 years. Of the 956,625 calls (69.8%) with sex information provided, 251,496 (26.3%) were female, 356,675 (37.2%) were male, and 348,454 (36.4%) were unknown. NPDS does not capture information on whether or not these animals were sexually intact. Ninety-seven percent (n=1,293,655) of all animal exposure calls occurred in the home or residence of the animal, with very few (n=289; <0.01%) calls originating from health care facilities (Table 4).

Information on the exposure substance was provided for 1,371,095 (100%) animal exposures. Pesticide exposures constituted the majority of all animal exposure calls (n=360,375; 26.3%), followed by 261,543 (18.6%) prescription drug exposures. Table 5 shows the distribution of animal exposure calls by substance category.

Pesticide exposures were responsible for the greatest number of deaths, with 1,643 (30.4%) calls reporting death as the outcome (Table 6). This was followed by 939 (17.0%) deaths due to other chemical exposures, and 876 (16.4%) deaths due to household chemical exposures, despite the fact that these categories only accounted for 44,610 (3.3%) and 121,713 (8.9%) of all animal exposure calls, respectively. Prescription drugs only accounted for 409 (7.9%) of all deaths. The most common outcome reported was 'Not followed, judged as nontoxic exposure or minimal clinical effects possible' (n=803,491; 58.6%), followed by 'Not followed, judged potentially toxic exposure' (n=263,153; 19.2%).

The most common sub-category of pesticide implicated as the exposure substance was 'other types of insecticides', which includes multi-compound ant and roach baits, fumigants, and multi-compound veterinary formulations, contributing 143,283 calls (39.8%) among all pesticide exposure calls in animals (Table 7). This was followed by long-acting anticoagulant rodenticides (n= 59,694; 16.6%) and pyrethroids (n=31,778; 8.8%). Long-acting anticoagulant rodenticides were responsible for the largest number of pesticide-associated deaths (n= 265; 16.1% of all pesticide deaths). This was followed by pyrethroids (n=192; 11.7%) and organophosphate insecticides (n=160 calls; 9.7%). The leading cause of deaths in dogs was long-acting anticoagulant rodenticides (n= 209; 22.3% of dog deaths) followed by unknown rodenticides (n= 82; 9.7%) and carbamates (n= 72; 8.5%). Pyrethroids were responsible for the most feline deaths (n=98; 23.7% of all cat deaths), followed by other insecticides (47; 12.2%), and pyrethrins (n= 43; 11.2%. Of the other chemical exposures, automotive products, including ethylene glycol antifreeze, constituted the greatest number of deaths, with 260 deaths. This represented 29.7% of all deaths attributed to other chemicals.

Discussion

According to the American Veterinary Medical Association, 58.3% of all households in the United States own a pet [13], for an estimated total of 85.1 million dogs and cats as pets [14]. This means that over half of all US households have the potential to need a pet-related consultation from a poison specialist or seek veterinary care after a chemical or drug exposure. The relatively large number of animal exposure calls captured by NPDS from January 2000 to December 2010—nearly one out of every 20 calls— suggests that the PCs are a resource already utilized by some for pets with potentially harmful exposures. With close to 5% of all NPDS exposure calls involving animals, a need exists for veterinary expertise and resources at PCs. This could be implemented by promoting collaboration between veterinary practitioners, veterinary toxicologists and PC staff. This is likely to improve outcomes in animal poisoning.

Dogs, particularly young dogs, were the most common species implicated in calls to PCs regarding potentially toxic exposures. This likely reflects a combination of the higher level of care-seeking behavior for small animals and inquisitive nature of young animals and is consistent with the findings of another, similar study, conducted in Europe [15]. Two other similar, but smaller, reports in the literature characterized data collected from animal exposure calls to NPDS in the United States in 1990 and 1993–4 [16,17]. Although information on animal species was not available, the first report found pesticide exposures

accounted for 29.6% of calls, followed by pharmaceuticals (including prescription medication, NSAIDs, and OTC medications) which were implicated in 25% of animal exposure calls. The second report only studied dog and cat exposures, and also found pesticides as the most common implicated cause of death. This trend is similar to our findings. Pesticides were also responsible for the largest proportion of deaths and major outcomes, and pesticides followed by prescription drugs were responsible for the largest percent of calls not followed but judged to be potentially toxic. This suggests that pesticides remain the primary poisoning health threat for animals. Among pesticide exposures, rodenticides were responsible for most canine deaths, while insecticides were responsible for the most feline deaths. The disproportionate number of deaths resulting from household- and other-chemical exposures suggests that these types of substances pose a significant health threat to animals. These types of chemicals are often labeled with hazard warnings intended to prevent unintentional toxicity. Therefore it is likely that animal owners need to be educated on potential threats to animals and proper storage and handling of these chemicals to prevent exposures to animals.

Very few animal exposure calls originated from health care facilities relative to human exposure calls originating from health care facilities. This suggests that PCs may be under-utilized by veterinarians compared to human health care providers. For example, over 16% of human exposure calls originated from health care facilities in 2009 [9].

The relatively large percentage of animal exposure calls in this study that were judged as potentially toxic but were not followed to determine medical outcome (20%) may suggest a gap in animal poisoning expertise, or it may be the result of PC specific policy for animal calls (PCs may not routinely follow up animal exposure calls). We were unable to determine if either of these was a causal factor.

There are a number of potential challenges to optimizing care for animals with toxic exposures. General practitioners of veterinary medicine obtain some training in toxicological emergencies during their education and may feel comfortable managing toxic emergencies without outside expertise. The only resource with readily available and specialized knowledge in veterinary toxicology uses a fee-for-service model, which may dissuade use. Finally, many people and general veterinarians may be unaware that the PC system established for toxic exposures in humans may also be used for veterinary exposures.

Most pets arrive at veterinary medical centers or an emergency department too long after an exposure has occurred for emesis or gastric decontamination to be an effective medical treatment [18]. These types of interventions are most effective when implemented immediately after the exposure and often require medical guidance to conduct. Having a toxicology resource available 24/7 by phone to determine when gastrointestinal decontamination and other pre-hospital care therapies can be a critical determinant in the clinical outcome of an exposure. Furthermore, early contact with toxicology specialists could save money, time, and medical resources through early referral to treatment when indicated.

The authors hope that by promoting collaboration among animal owners, animal healthcare providers and PC staff, the use of PCs for animal exposures will also increase. Since all PCs upload their local data in near real-time (approximately every 19 minutes) to NPDS, the robustness of NPDS will also increase [19]. Since 2001, the Centers for Disease Control and Prevention has collaborated with AAPCC to use NPDS for national public health surveillance of chemical and poison exposures and illness. Surveillance efforts to date have focused primarily on human health threats but animal illness can serve as a sentinel event for human illness [20]. Surveillance methodologies can also be created for animal exposures and illness. Surveillance of these calls can be useful for large-scale animal food related contamination events which may also impact human health or food safety [21].

In 2007, thousands of dogs and cats were poisoned from ingesting pet food contaminated with melamine [22]. A concomitant increase in calls to veterinary clinics and poison centers regarding renal failure in dogs and cats was noted during that time. Surveillance of animal calls could prompt veterinary public health action during a large-scale outbreak as was seen during the 2007 melamine contamination event. Importantly, these exposures can have implications for human public health, as animals were fed melamine during this outbreak and melamine was later found in human food items as well. An increased incidence of animal illness can occur following natural disasters such as hurricanes, when displaced animals have greater potential to encounter hazardous situations and materials, and may indicate areas of public health need for human populations as well. Finally, identification of enhanced reporting of animal exposures to NPDS and subsequent surveillance efforts could be used to identify trends in emerging environmental health threats to animals and highlight needs in additional veterinary services and training.

This study is subject to certain limitations. Because not all pet/animal owners may be aware that the PCs take animal-related calls, the NPDS cases may not be representative of all animal exposures that occur within the US. This is likely given that the regions with the highest number of calls did not necessarily also have the highest populations [23]. Furthermore, there was a significant amount of variability in the percent of all animal exposure calls from region to region, which may reflect variability in public awareness education conducted from center to center. Additionally, some exposures may have either sufficiently acute effects or delayed effects that the owner would be less likely to call a PC for these exposures, and therefore these substances may not be captured in NPDS as potential animal health threats. This is less likely however, as exposures to both acute-acting and long-acting substances are among those reported in this study. The fewest number of animal exposure calls occurred in 2010. This likely reflects declining call volumes seen overall. Finally, the extent of veterinary toxicology expertise available to PCs is unknown. More work needs to be done to assess the current state of animal toxicology knowledge and resources among PCs.

Conclusions

Although PCs may be underutilized as a resource for toxic exposures in animals, they receive a large volume of animal-related calls. Because of this volume, PCs may serve an important surveillance role with implications for both animal and human health. Therefore,

PCs should increase educational resources and collaboration among animal PCs, animal healthcare practitioners, and veterinarians with expertise in toxicology about the proper evaluation, management, and treatment of chemical and poison exposures. Pesticides remain one of the greatest toxic exposure threats to animals, both in absolute number, as well as, associated clinical outcomes severity. Education on pesticide type, exposure evaluation and management should be an integral part of any instructional activities developed for PC staff.

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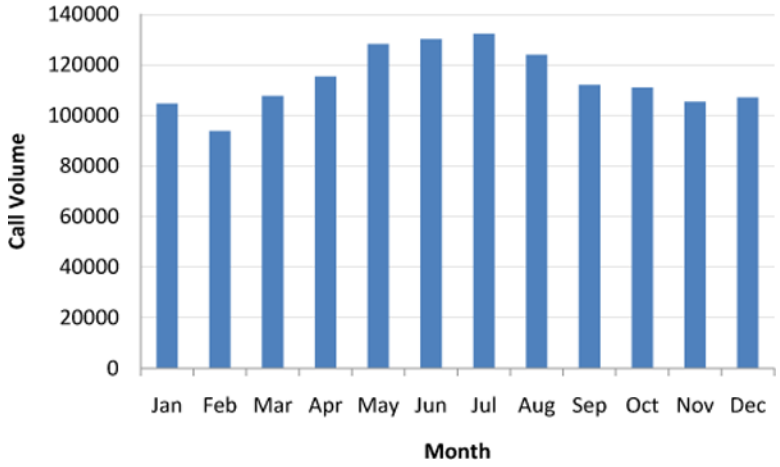

Figure 1.

Distribution of all animal exposure calls reported to the National Poison Data System from by month, January 1, 2000 to December 31, 2010.

Table 1

Distribution of animal exposure calls to the National Poison Data System by year and reason, January 1, 2000 to December 31, 2010.

Year	Animal Exposure calls	Percent of all animal exposure calls from 2000 to 2010	Animal Information Calls	Animal exposure calls as a percentage of all animal calls	Animal exposure calls as a percentage of all (human and animal) exposure calls
2000	99,934	7.3	2,187	97.9	3.8
2001	114,548	8.4	2,367	98.0	4.3
2002	132,408	9.7	2,469	98.2	4.8
2003	135,392	9.9	2,747	98.0	5.0
2004	141,980	10.4	2,955	98.0	5.1
2005	133,644	9.8	2,909	97.9	5.1
2006	131,414	9.6	3,051	97.7	5.0
2007	134,069	9.8	3,840	97.2	5.0
2008	133,230	9.7	3,492	97.4	5.4
2009	118,268	8.6	3,327	97.3	4.3
2010	96,208	7.0	2,995	97.0	4.2
Total	1,371,095	100.0	32,339	97.7	4.7

* Total represents calls from 2000 to 2010 (Bronstein et al, 2010)

Table 2

Distribution of all animal exposure calls reported to the National Poison Data System by geographic region of origin, January 1, 2000 to December 31, 2010.

Region*	Frequency	Percent of all animal calls	Percent of total (human and animal) calls
1	33,602	2.5	2.7
2	103,463	7.5	4.7
3	192,393	14.0	6.2
4	291,898	21.3	5.3
5	188,705	13.8	3.8
6	144,890	10.6	4.2
7	26,304	1.9	1.9
8	79,037	5.8	5.8
9	198,419	14.5	5.0
10	103,849	7.6	6.3
Outside US	8,348	0.6	8.9
Unknown	187	0.0	5.7
Totals	1,371,095	100.0	4.7

* Regions include: 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont); 2(New Jersey, New York, Puerto Rico, US Virgin Islands); 3 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia); 4(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee); 5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin); 6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas); 7 (Iowa, Kansas, Missouri, Nebraska); 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming); 9 (Arizona, California, Hawaii, Nevada, Other US territories and commonwealth); 10 (Alaska, Idaho, Oregon, Washington). Overseas US, Canada, Mexico, and other countries were included in a single category of Outside US

Table 3

Distribution of animal type, age, and sex for all animal exposure calls reported to the National Poison Data System from January 1, 2000 to December 31, 2010.

NPDS Animal Type	Total N of animals	Percent of animal type	Number with age information	Mean Age (95% CI)	Median Age	N (%) Female	N (%) Male	N (%) Unknown sex
Aquatic	517	<0.1	188	7.1 (4.7–9.5)	0.5	35 (9.6)	58 (15.9)	272 (74.5)
Bird	5,634	0.4	2,151	4.3(3.9–4.6)	2.0	600 (15.3)	1,033 (26.4)	2,282 (58.3)
Cat	142,924	10.4	68,866	4.2 (4.1–4.2)	2.0	28,720 (29.0)	29,229 (29.6)	40,928 (41.4)
Cow	965	0.1	405	4.3 (3.8–4.9)	3.0	186 (27.7)	172 (25.3)	320 (47.0)
Dog	1,207,018	88.0	647,349	4.1 (4.0–4.1)	2.0	219,673 (26.1)	322,849 (38.3)	300,070 (35.6)
Horse	3,486	0.3	2,095	13.4 (12.6–14.1)	6.0	898 (32.4)	1,044 (37.7)	825 (29.8)
Other	4,508	0.3	1,867	4.7 (4.4–5.1)	2.0	535 (17.1)	1,001 (32.0)	1,589 (50.9)
Rodent	4,891	0.4	1,963	4.9 (4.5–5.4)	2.0	621 (17.8)	1,044 (30.0)	1,821 (52.2)
Sheep/Goat	1,152	0.1	564	3.8 (3.2–4.4)	2.0	228 (27.8)	245 (30.0)	347 (42.3)
Total	1,371,095	100	742,047	4.1 (4.0–4.1)	2.0	251,496 (26.3)	356,675 (37.2)	348,454 (36.4)

Table 4

Distribution of exposure location for all animal exposure calls reported to the National Poison Data System, January 1, 2000 to December 31, 2010.

Exposure site	Frequency	Percent
Health care facility	289	<0.1
Other	4,701	0.4
Other residence	22,728	1.7
Own residence	1,293,655	97.0
Public area	5,350	0.4
Restaurant	102	<0.1
School	86	<0.1
Unknown	5,405	0.4
Workplace	1,643	0.1
Total	1,333,959*	100.0

* No exposure site information was reported for 37,136 calls

Table 5

Distribution of exposure substances for all animal exposure calls to the National Poison Data system, January 1, 2000 to December 31, 2010.

Category	Dog	Cat	Cow	Horse	Aquatic	Sheep/Goat	Bird	Rodent	Other	Total
Pesticides	325,642 (27.0)	29,856 (20.9)	307 (31.8)	1,131 (32.4)	83 (16.1)	290 (25.2)	1,038 (18.4)	1,065 (21.8)	963 (21.4)	360,375 (26.3)
Prescription Drugs	239,841 (19.9)	19,705 (13.8)	82 (8.5)	390 (11.2)	29 (5.6)	41 (3.6)	556 (9.9)	450 (9.2)	449 (10.0)	261,543 (18.6)
Household Chemicals	108,271 (9.0)	11,120 (7.8)	171 (17.7)	297 (8.5)	140 (27.1)	96 (8.3)	770 (13.7)	380 (7.8)	468 (10.4)	121,713 (8.9)
Cleaning Substances	84,992 (7.0)	19,855 (13.9)	45 (4.7)	219 (6.3)	60 (11.7)	35 (3.0)	774 (13.7)	682 (13.9)	533 (11.8)	107,195 (7.8)
Plants	69,206 (5.7)	21,881 (15.3)	139 (14.4)	490 (14.1)	24 (4.6)	466 (40.5)	1,105 (19.6)	945 (19.3)	758 (16.8)	95,014 (6.9)
OTC	74,058 (6.1)	4,668 (3.3)	18 (1.9)	177 (5.1)	11 (2.1)	13 (1.1)	162 (2.9)	177 (3.6)	159 (3.5)	79,443 (5.8)
Foreign Objects	58,720 (4.9)	9,548 (6.7)	21 (2.2)	70 (2.0)	39 (7.5)	17 (1.5)	143 (2.5)	216 (4.4)	207 (4.6)	68,981 (5.0)
Supplements	50,308 (4.2)	2,988 (2.1)	23 (2.4)	105 (3.0)	3 (0.6)	10 (0.9)	53 (0.9)	77 (1.6)	84 (1.9)	53,651 (3.9)
NSAIDS	47,329 (3.9)	3,092 (2.2)	10 (1.0)	105 (3.0)	4 (0.8)	9 (0.8)	86 (1.5)	89 (1.8)	97 (2.2)	50,821 (3.7)
Other Chemicals	37,788 (3.1)	5,594 (3.9)	75 (7.8)	142 (4.1)	64 (12.4)	46 (4.0)	465 (8.3)	212 (4.3)	224 (5.0)	44,610 (3.3)
Cosmetics	36,645 (3.0)	3,308 (2.3)	12 (1.2)	104 (3.0)	15 (2.9)	9 (0.8)	172 (3.1)	195 (4.0)	156 (3.5)	40,616 (3.0)
Paints and Solvents	30,541 (2.5)	6,470 (4.5)	42 (4.4)	100 (2.9)	35 (6.8)	88 (7.6)	183 (3.3)	136 (2.8)	164 (3.6)	37,759 (2.8)
Illegal Drugs	23,450 (1.9)	2,199 (1.5)	5 (0.5)	31 (0.9)	1 (0.2)	15 (1.3)	47 (0.8)	34 (0.7)	82 (1.8)	25,864 (1.9)
Bites and Envenomations	14,157 (1.1)	2,104 (1.5)	14 (1.5)	94 (2.7)	7 (1.4)	8 (0.7)	29 (0.5)	213 (4.4)	108 (2.4)	16,734 (1.2)
Food Poisoning	3,218 (0.3)	376 (0.3)	0 (0.0)	26 (0.8)	2 (0.4)	4 (0.4)	26 (0.5)	10 (0.2)	41 (0.9)	3,703 (0.3)
Tobacco and Nicotine	2,842 (0.2)	160 (0.1)	1 (0.1)	5 (0.1)	0 (0.0)	5 (0.4)	25 (0.4)	10 (0.2)	15 (0.3)	3,063 (0.2)
Total	1,207,018 (88.2)	142,924 (10.4)	965 (0.1)	3,507 (0.3)	517 (<0.01)	1,152 (0.1)	5,634 (0.4)	4,891 (0.4)	4,508 (0.3)	1,371,095 (100)

Table 6

Distribution of outcome, by animal type, for all animal exposure calls reported to the National Poison Data System, January 1, 2000 to December 31, 2010.

	Aquatic	Bird	Cat	Cow	Dog	Horse	Other	Rodent	Sheep/Goat	Total
Death	120 (23.2)	481 (8.5)	1,279 (0.9)	143 (14.8)	2,964 (0.3)	80 (2.3)	126 (2.8)	138 (2.7)	62 (5.4)	5,388 (0.4)
Major effect	7 (1.4)	30 (0.5)	1,194 (0.8)	13 (1.4)	2,773 (0.2)	40 (1.2)	30 (0.7)	38 (0.8)	7 (0.6)	4,132 (0.3)
Moderate effect	7 (1.4)	101 (1.8)	4,335 (3.0)	25 (2.6)	15,746 (1.3)	124 (3.6)	73 (1.6)	81 (1.7)	30 (2.6)	20,522 (1.5)
Not followed, minor effects possible	180 (34.8)	2,659 (47.2)	76,032 (53.2)	329 (34.1)	717,520 (59.5)	1,560 (44.8)	2,296 (50.9)	2,499 (51.1)	416 (36.1)	803,491 (58.6)
Unable to follow, judged as potentially toxic	123 (23.8)	1,340 (23.8)	29,969 (21.0)	262 (27.2)	227,709 (18.9)	808 (23.2)	1,230 (27.3)	1,286 (26.3)	408 (35.4)	263,135 (19.2)
Unrelated effect, not likely related to exposure	13 (2.5)	126 (2.2)	8,184 (5.7)	40 (4.2)	30,280 (2.5)	180 (5.2)	137 (3.0)	200 (4.1)	32 (2.8)	39,142 (2.9)
Minor or no effect	67 (13.0)	897 (15.9)	21,981 (15.4)	153 (15.9)	210,026 (17.4)	694 (19.9)	616 (13.7)	654 (13.4)	197 (17.1)	235,285(17.2)
Total	517 (0.04)	5,634 (0.4)	142,924 (10.4)	965 (0.1)	1,207,018 (88.0)	3,486 (0.3)	4,508 (0.3)	4,891 (0.4)	1,152 (0.1)	1,371,095 (100)

Table 7

Distribution of animal exposure call outcomes by exposure substance reported to the National Poison Data System from January 1, 2000 to December 31, 2010.

	Household chemicals	NSAIDS	OTC	Bites and envenomations	Cleaning substances	Cosmetics	Food poisoning	Foreign objects	Illegal drugs
Death	876 (0.7)*	98 (0.2)	39 (0.1)	95 (0.6)	381 (0.4)	32 (0.1)	43 (1.2)	67 (0.1)	136 (0.5)
Major effect	341 (0.3)	110 (0.2)	96 (0.1)	86 (0.5)	384 (0.4)	42 (0.1)	21 (0.6)	53 (0.1)	117 (0.5)
Moderate effect	1,815 (1.5)	633 (1.3)	872 (1.1)	522 (3.1)	2,350 (2.2)	318 (0.8)	97 (2.6)	392 (0.6)	641 (2.5)
Not followed, minor effects possible	72,313 (59.4)	23,346 (45.9)	52,207 (65.7)	8,756 (52.3)	63,465 (59.2)	30,684 (75.6)	2,113 (57.1)	53,728 (77.9)	9,150 (35.4)
Unable to follow, judged as potentially toxic	20,628 (17.0)	18,847 (37.1)	12,990 (16.4)	4,581 (27.4)	11,924 (11.1)	2,704 (6.7)	632 (17.1)	3,320 (4.8)	12,531 (48.5)
Unrelated effect, not likely related to exposure	4,521 (3.7)	451 (0.9)	1,099 (1.4)	421 (2.5)	5,534 (5.2)	926 (2.3)	163 (4.4)	1,714 (2.5)	210 (0.8)
Minor or no effect	21,219 (17.4)	7,336 (14.4)	12,140 (15.3)	2,273 (13.6)	23,157 (21.6)	5,910 (14.6)	634 (17.1)	9,707 (14.1)	3,079 (11.9)
Total	121,713 (8.7)	50,821 (3.6)	79,443 (5.7)	16,734 (1.2)	107,195 (7.6)	40,616 (2.9)	3,703 (0.3)	68,981 (4.9)	25,864 (1.8)

	Other chemicals	Paints and solvents	Pesticides	Plants	Prescription drugs	Supplements	Tobacco and nicotine	Total
Death	939 (2.1)*	120 (0.3)	1,643 (0.5)	419 (0.4)	409 (0.2)	90 (0.2)	1 (0.0)	5,388 (0.4)
Major effect	187 (0.4)	67 (0.2)	1,711 (0.5)	310 (0.3)	531 (0.2)	67 (0.1)	9 (0.3)	4,132 (0.3)
Moderate effect	916 (2.1)	447 (1.2)	5,916 (1.6)	1,763 (1.9)	3,221 (1.2)	550 (1.0)	69 (2.3)	20,522 (1.5)
Not followed, minor effects possible	23,405 (52.5)	24,810 (65.7)	198,588 (55.1)	57,613 (60.6)	147,131 (56.3)	34,934 (65.1)	1,245 (40.7)	803,491 (58.6)
Unable to follow, judged as potentially toxic	9,481 (21.3)	4,359 (11.5)	66,706 (18.5)	14,582 (15.4)	70,062 (26.8)	8,670 (16.2)	1,116 (36.4)	263,135(19.2)
Unrelated effect, not likely related to exposure	1,570 (3.5)	1,276 (3.4)	12,078 (3.4)	5,637 (5.9)	2,807 (1.1)	682 (1.3)	53 (1.7)	39,142 (2.9)
Minor or no effect	8,112 (18.2)	6,680 (17.7)	73,733 (20.5)	14,690 (15.5)	37,382 (14.3)	8,658 (16.1)	570 (18.6)	235,285 (17.2)
Total	44,610 (3.2)	37,759 (2.7)	360,375 (25.7)	95,014 (6.8)	261,543 (18.6)	53,651 (3.8)	3,063 (0.2)	1,371,095 (100.0)

*Frequency of calls with given substance as primary exposure and outcome listed in the row, followed by percent of column total given in parentheses