

2021 Annual Report of the Kansas Poison Control Center at The University of Kansas Health System

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ABSTRACT

Introduction. This is the 2021 Annual Report of the Kansas Poison Control Center (KSPCC) at The University of Kansas Health System. The KSPCC serves the state of Kansas 24-hours a day, 365 days a year with certified specialists in poison information and clinical and medical toxicologists.

Methods. Encounters reported to the KSPCC from January 1, 2021 through December 31, 2021 were analyzed. Data recorded includes caller demographics, exposure substance, nature and route of exposure, interventions, medical outcome, disposition, and location of care.

Results. The KSPCC logged 18,253 total encounters in 2021, including calls from every county in Kansas. A majority of human exposure cases (53.6%) were female. Approximately 59.8% were pediatric exposures (defined as 19 years of age or less). Most encounters occurred at a residence (91.7%) and most were managed there (70.5%). Unintentional exposures were the most common reason for exposures (70.5%). The most common reported substance in pediatric encounters was household cleaning products (n = 815) and cosmetics/personal care products (n = 735). For adult encounters, analgesics (n = 1,241) and sedative/hypnotics/antipsychotics (n = 1,013) were the most frequently reported. Medical outcomes were 26.0% no effect, 22.4% minor effect, 10.7% moderate effect, and 2.7% major effects. There were 22 deaths.

Conclusions. The 2021 KSPCC annual report demonstrated that cases were received from the entire state of Kansas. Pediatric exposures remained most common but cases with serious outcomes continued to increase. This report supported the continued value of the KSPCC to both public and health care providers in the state of Kansas.

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INTRODUCTION

This is the 2021 Annual Report of Kansas Poison Control Center at The University of Kansas Health System (KSPCC). The KSPCC is a 24-hour 365 day/year health care information resource serving the state of Kansas. It was founded in 1982 and is one of the 55 poison control centers certified by the American Association of Poison Control Centers (AAPCC) in the United States. The KSPCC is staffed by 12 certified specialists in poison information who are either critical care trained nurses or Doctors of Pharmacy. There is 24-hour back-up provided by five board-certified clinical and medical toxicologists.

The KSPCC receives calls from the public, law enforcement, health care professionals, and public health agencies. Encounters may involve

an exposed animal or human (Exposure Call) or a request for information with no known exposure (Information Call). The KSPCC follows all cases to make management recommendations, monitor case progress, and document medical outcome. This information is recorded electronically in the Toxicall® data management system and uploaded in near real-time to the National Poison Data System (NPDS).

NPDS is the data warehouse for all the nation's poison control centers.¹ The average time to upload data for all poison centers is 6.15 ([4.60, 8.62]; median [25%, 75%]) minutes, creating a near real-time national exposure database and surveillance system. The KSPCC has the ability to share NPDS real time surveillance with state and local health departments and other regulatory agencies. The analysis and summary of all encounters reported to the KSPCC from January 1, 2021 to December 31, 2021 is reported below.

METHODS

All KSPCC encounters recorded electronically in the Toxicall® data management system from January 1, 2021 to December 31, 2021 were analyzed. Cases were first classified as either an exposure or suspected exposure (Human Exposure, Animal Exposure, Non-Exposure Confirmed Cases) or a request for information with no reported exposure (Information Call). Extracted data included caller location, age, weight, gender, exposure substance, number of follow-up calls, nature of exposure (i.e., unintentional, recreational, or intentional), exposure scenario, route of exposure (oral, dermal, parenteral), interventions, medical outcome (no effect, minor, moderate, severe, or death), disposition (managed on site, admitted to noncritical care unit, admitted to critical care unit, admitted to psychiatry unit, lost to follow-up, or treated and released) and location of care (non-health care facility or health care facility). For this analysis, a pediatric case was defined as any patient 19 years of age or less. This was consistent with NPDS methodology. Similarly, NPDS descriptions of the medical outcomes of cases were used: minor - minimally bothersome symptoms, moderate - more pronounced symptoms, usually requiring treatment, and major - life threatening signs and symptoms. Data were analyzed using Microsoft® Excel (Microsoft Corp, Redmond, WA).

RESULTS

The KSPCC logged 18,253 total cases in 2021. This was a decrease of 1,527 cases (7.7%) compared to 2020. In 2021, there were 16,963 human exposure cases, 57 non-exposure confirmed cases, 72 animal exposure cases, and 1,161 information calls. For information calls, drug information (n = 313) was the most common reason for calling. Table 1 describes the encounter types.

The KSPCC made 33,700 follow-up calls in 2021. Follow-up calls were done in 62.0% of human exposure cases. One follow-up call was made in 23.6% of human exposure cases and multiple follow-up calls (range 2-57) were made in 38.4% of cases. For human exposure cases which required a follow-up call, an average of three follow-up calls were performed per case. The KSPCC received calls from all 105 counties and every hospital in Kansas. The county with the largest number of calls was Sedgwick County with 2,896. In addition, calls were received from 46 other states, and the District of Columbia.

A majority of human exposure cases were female (53.6%, n = 9,099). In children younger than 13 years of age a majority were male, but this gender distribution was reversed in teenagers and adults. In fact, in the age group involving children 13-19 years of age, 68.9% of cases were female. Approximately 59.8% (n = 10,135) of human exposures involved a child (defined as age 19 years or less).

Table 2 illustrates distribution of human exposures by age and gender. Contrary to previous years, patients 12-23 months of age were the most common age group involved in encounters reported to the KSPCC. For adults, the age group of 20-29 years old was most encountered. Fifty-nine exposures occurred in pregnant women (0.3% of all human exposures). Of these exposures, 27.1% (n = 16) occurred in the first trimester, 33.9% (n = 20) occurred in the second trimester, and 30.5% (n = 18) occurred in the third trimester. Most exposures in pregnant women (50.9%, n = 30) were unintentional exposures with 32.2% (n = 19) resulting from intentional exposures. There were no deaths of a pregnant woman reported to the KSPCC in 2021.

For human exposures, 61.1% (n = 10,368) of calls originated from a residence (own or other), while 91.8% (n = 15,565) of these exposures occurred at a residence (own or other). Calls from a health care facility accounted for 29.5% (n = 5,005) of human exposure encounters. Table 3 further details the origin of human exposure cases and the site of the exposure. Most human exposures, 81.7% (n = 13,855), were acute cases defined as exposures occurring over eight hours or less. Chronic exposures defined as exposures occurring over > 8 hours accounted for 2.2% (380) of all human exposures. Acute on chronic exposures defined as single exposure that was preceded by a chronic exposure over > 8 hours totaled 2,552 (15.0%). Ingestion was the most common route of exposure (85.1%, n=14,435) documented (Table 4).

The most common reported substance category in those less than six years of age was household cleaning products (n = 815) followed closely by cosmetics/personal care products (n = 735). Table 5 lists the substances most frequently involved in exposures for those ≤ 5 years old and compares their rank to last year. For adult cases (> 19 years of age), analgesics (n = 1,241) and sedative/hypnotics/antipsychotics (n = 1,013) were the most frequently involved substances as seen in Table 6. Table 6 lists the substances most frequently involved in adult exposures and compares their rank to last year. Among all encounters, analgesics (12.4%, n = 2,740) were the most frequently encountered substance category. Table 7 is a summary log for all exposures categorized by category and sub-category of substance (available only online at journals.ku.edu/kjm).

In 2021, there was a total of 391 plant exposures reported to the KSPCC. The single most common plant exposure encountered was pokeweed (*Phytolacca Americana*; n = 70). Table 8 lists the top five most encountered plants.

Unintentional exposures were the most common reason for exposures (70.5%, n = 11,952) while intentional exposures accounted for 25.6% (n = 4,354) of exposures. Table 9 lists reasons for human exposures. Most unintentional exposures, 57.7% (n = 6,898) occurred in the ≤ 5-year-old age group. In patients less than 13 years of age, 96.8% (n = 7,757) of ingestions were unintentional. However, in the 13 to 19-year-old group, intentional exposure was most common (76.2%, n = 1,613). In total, suspected suicide attempts accounted for 19.9% (n = 3,381) of

human encounters. When a therapeutic error was the reason for exposure, a double dose was the most common scenario (29.3%, n = 624).

Most encounters (61.0%, n = 10,347) were managed in a non-health care facility (i.e., a residence). Of the 6,264 encounters managed at a health care facility, 37.5% (n = 2,346) were admitted. Table 10 lists the management site of all human encounters.

Among human exposures, 14,047 involved exposures to pharmaceutical agents while 7,982 involved exposures to non-pharmaceuticals. Because an encounter could include numerous pharmaceutical agents and non-pharmaceutical agents, this total was greater than the total number of encounters. However, 83.6% (n = 14,173) of all human exposures were exposed to only a single substance. Among these single substance exposures, the reason for exposure was intentional in 30.4% (n = 2,295) of pharmaceutical-only cases compared to 4.6% (n = 306) of non-pharmaceutical single substance exposures.

Table 1. Encounter type.

	Number	%
Exposure		
Human Exposure	16,963	92.93
Animal Exposure	72	0.39
Subtotal	17,035	93.33
Non-Exposure Confirmed Cases		
Human Non-Exposure	57	0.31
Subtotal	57	0.31
Information Call		
Drug information	313	1.71
Drug identification	28	0.15
Environmental information	63	0.35
Medical information	35	0.19
Occupational information	4	0.02
Poison information	91	0.50
Prevention/safety/education	12	0.07
Teratogenicity information	2	0.01
Other information	50	0.27
Substance abuse	4	0.02
Administrative	40	0.22
Caller referred	519	2.84
Subtotal	1,161	6.36
Total	18,253	100.0

Table 2. Distribution of human exposures by age and gender.

Age (years)	Male		Female		Unknown Gender		Total		Cumulative Total	
	N	% of Age Group Total	N	% of Age Group Total	N	% of Age Group Total	N	% of Total Exposure	N	%
< 1 year	391	50.32	385	49.55	1	0.13	777	4.58	777	4.58
1 year	1,147	51.69	1,068	48.13	4	0.18	2,219	13.08	2,996	17.66
2 years	1,078	50.85	1,041	49.10	1	0.05	2,120	12.5	5,116	30.16
3 years	592	57.36	440	42.64	0	0.00	1,032	6.08	6,148	36.24
4 years	276	55.42	222	44.58	0	0.00	498	2.94	6,646	39.18
5 years	172	57.72	126	42.28	0	0.00	298	1.76	6,944	40.94
Unknown ≤ 5 years	1	50.00	1	50.00	0	0.00	2	0.01	6,946	40.95
Child 6-12 years	555	52.06	511	47.94	0	0.00	1,066	6.28	8,012	47.23
Teen 13-19 years	657	31.05	1,457	68.86	2	0.09	2,116	12.47	10,128	59.71
Unknown Child	2	28.57	4	57.14	1	14.29	7	0.04	10,135	59.75
Subtotal	4,871	48.06	5,255	51.85	9	0.09	10,135	59.75	10,135	59.75
20-29 years	784	43.85	1,004	56.15	0	0.00	1,788	10.54	11,923	70.29
30-39 years	679	48.71	712	51.08	3	0.22	1,394	8.22	13,317	78.51
40-49 years	408	42.46	552	57.44	1	0.10	961	5.67	14,278	84.17
50-59 years	364	40.44	535	59.44	1	0.11	900	5.31	15,178	89.48
60-69 years	331	40.71	482	59.29	0	0.00	813	4.79	15,991	94.27
70-79 years	214	41.72	299	58.28	0	0.00	513	3.02	16,504	97.29
80-89 years	102	40.80	148	59.2	0	0.00	250	1.47	16,754	98.77
≥ 90 years	19	36.54	33	63.46	0	0.00	52	0.31	16,806	99.07
Unknown adult	57	47.11	62	51.24	2	1.65	121	0.71	16,927	99.79
Subtotal	2,958	43.55	3,827	56.35	7	0.10	6,792	40.04	16,927	99.79
Unknown age	14	38.89	17	47.22	5	13.89	36	0.21	16,963	100.0
Total	7,843	46.24	9,099	53.64	21	0.12	16,963	100.00	16,963	100.00

Table 3. Origin of call and site of exposure for human exposure cases.

Site	Site of Caller		Site of Exposure	
	N	%	N	%
Residence				
Own	10,109	59.59	15,044	88.69
Other	259	1.53	521	3.07
Workplace	195	1.15	387	2.28
Health care facility	5,005	29.51	88	0.52
School	42	0.25	236	1.39
Restaurant/food service	5	0.03	22	0.13
Public area	90	0.53	175	1.03
Other	1,222	7.20	259	1.53
Unknown	36	0.21	231	1.36

Table 4. Route of human exposures.

Route	Human Exposures*		
	N	% of All Routes	% of All Cases
Ingestion	14,435	79.25	85.10
Dermal	1,423	7.81	8.39
Inhalation/nasal	1,140	6.26	6.72
Ocular	644	3.54	3.80
Bite/sting	160	0.88	0.94
Parenteral	220	1.21	1.30
Unknown	128	0.70	0.75
Aspiration (with ingestion)	26	0.14	0.15
Otic	8	0.04	0.05
Other	15	0.08	0.09
Vaginal	8	0.04	0.05
Rectal	7	0.04	0.04
Total Number of Routes	18,214	100.00	107.37

*Cases may have multiple routes of exposure documented.

Table 5. Substance categories most frequently involved in exposures for age ≤ 5 years old.

Substance Category	Previous Year Rank	All Substance	%	Single Substance Exposures	%
Cleaning substances (household)	1	815	11.11	779	11.64
Cosmetics/personal care products	2	735	10.02	698	10.43
Analgesics	3	605	8.24	536	8.01
Dietary supplements/herbals/homeopathic	4	479	6.53	466	6.97
Foreign bodies/toys/miscellaneous	5	454	6.19	440	6.58
Antihistamines	6	397	5.41	355	5.31
Vitamins	7	334	4.55	293	4.38
Topical preparations	8	273	3.72	261	3.90
Pesticides	9	254	3.46	251	3.75
Plants	10	234	3.19	227	3.39
Gastrointestinal preparations	11	220	3.00	187	2.80
Electrolytes and minerals	13	169	2.30	144	2.15
Cardiovascular drugs	12	164	2.23	96	1.43
Hormones and hormone antagonists	14	155	2.11	111	1.66
Antidepressants*	18	133	1.81	92	1.38

*Arts/crafts/office supplies was previous category #15

Table 6. Substance categories most frequently involved in exposures of adults (> 19 years).

Substance Category	Previous Year Rank	All Substances	%	Single Substance Exposures	%
Analgesics	1	1,241	11.75	512	10.38
Sedative/hypnotics/antipsychotics	2	1,013	9.59	274	5.55
Antidepressants	3	905	8.57	269	5.45
Cardiovascular drugs	4	736	6.97	227	4.60
Alcohols	5	603	5.71	63	1.28
Antihistamines	7	469	4.44	195	3.95
Cleaning substances (household)	6	444	4.20	322	6.53
Anticonvulsants	8	423	4.00	120	2.43
Hormones and hormone antagonists	10	355	3.36	170	3.45
Pesticides	9	343	3.25	276	5.59
Stimulants and street drugs	11	329	3.11	120	2.43
Fumes/gases/vapors	12	271	2.57	233	4.72
Cosmetics/personal care products	13	238	2.25	199	4.03
Gastrointestinal preparations*	17	201	1.90	61	1.24
Muscle relaxants [†]	16	201	1.90	59	1.20

*Chemicals was previous category #14

[†]Antimicrobials was previous category #15

Table 8. Top five most frequent plant exposures.

Botanical Name or Category	N
Phytolacca americana (Pokeweed)	70
Plants-general-unknown toxicity	44
Plants: Non-toxic	33
Oxalates (Species unspecified)	33
Cherry (Species unspecified, wild & domesticated)	20
Total of all Plant Calls	391

Table 9. Reason for human exposure cases.

Unintentional	N	%
Unintentional - General	7,321	43.2
Unintentional - Therapeutic error	2,128	12.5
Unintentional - Misuse	1,424	8.4
Unintentional - Environmental	491	2.9
Unintentional - Occupational	309	1.8
Unintentional - Bite/sting	160	0.9
Unintentional - Food poisoning	105	0.6
Unintentional - Unknown	14	0.1
Subtotal	11,952	70.5
Intentional		
Intentional - Suspected suicide	3,381	19.9
Intentional - Misuse	472	2.8
Intentional - Abuse	432	2.5
Intentional - Unknown	69	0.4
Subtotal	4,354	25.6

Table 9. Reason for human exposure cases. *continued.*

Adverse Reaction	N	%
Adverse reaction - Drug	313	1.8
Adverse reaction - Food	45	0.3
Adverse reaction - Other	52	0.3
Subtotal	410	2.4
Unknown		
Unknown reason	126	0.7
Subtotal	126	0.7
Other		
Other - Malicious	76	0.4
Other - Withdrawal	16	0.1
Other - Contamination/tampering	29	0.2
Subtotal	121	0.7
Total	16,963	100

Table 10. Management site of human exposures.

Site of Management	N	%
Managed in healthcare facility		
Treated/evaluated and released	3,666	21.6
Admitted to critical care unit	1,048	6.2
Admitted to noncritical care unit	742	4.4
Admitted to psychiatric facility	556	3.3
Patient lost to follow-up/left Against Medical Advice	252	1.5
Subtotal (managed in healthcare facility)	6,264	36.9
Managed on site, non-healthcare facility	10,347	61.0
Other	36	0.2
Refused referral	286	1.7
Unknown	30	0.2
Total	16,963	100.0

When medical outcomes were analyzed, 26.0% (n = 4,414) of human exposures had no effect, 22.4% (n = 3,801) had minor effects, 10.7% (n = 1,815) had moderate effects, and 2.7% (n = 457) had major effects. Moderate effects were more common in the 13 to 19-year-old group while major effects were more common in those over 20 years of age. Moderate and major effects were most common in those with intentional encounters. More serious outcomes were related to single-substance pharmaceutical exposures, accounting for 18.2% (n = 4) of the fatalities. Table 11 lists all medical outcomes by age and Table 12 lists outcomes by reason for exposure.

Use of decontamination and specific therapies, including antidotal therapy, is detailed in Tables 13a and 13b. There were 22 deaths in 2021 reported to the KSPCC. All but one death involved patients 20 years of age or older, and 17 of the deaths involved intentional exposures. There was one death in a 17-year-old. Table 14 details the 22 reported deaths (available only online at journals.ku.edu/kjm).

Table 15 compares key statistics from 2015 to 2021. Overall case volumes have declined since 2016. However, there was an increase in calls from healthcare facilities in 2021 and the number of deaths increased from 2020 to 2021.

DISCUSSION

The Kansas Poison Control Center at The University of Kansas Health System is one of 55 accredited poison control centers in the United States that comprise the American Association of Poison Control Centers (AAPCC). The KSPCC's 2021 experience reflects nationwide data and trends that have witnessed increased rates of serious poisonings and overdoses. The top five substances involved in KSPCC human exposures for both adults and children remained the same compared to 2020 and, overall, was similar to national data,¹ with one notable exception; cardiovascular drug exposures were reported at a higher rate to the KSPCC.

According to the Annual Surveillance Report of Drug-Related Risks and Outcomes, drug poisoning-related hospitalizations in the United States have increased 26% in the last two years that data are available.^{2,3} National poison center data demonstrated that while human exposures with less serious outcomes have decreased 1.90% per year since 2008, more serious outcomes (moderate, major, or death) have increased 4.59% per year since 2000.⁴ Similarly, the KSPCC continued to see an increase in the number of cases from healthcare facilities and cases with moderate or major medical outcomes. Since 2015, calls to the KSPCC from healthcare facilities have increased by 17.3% and account for approximately 30% of all cases.⁵⁻⁹ Not surprisingly, moderate/major outcomes also have increased by 34.6% since 2015. The percent of cases with a moderate/major outcome was 7.8% of overall cases in 2015 compared to 2021 where these cases accounted for 12.4% of the overall case volume.

The National Institute on Drug Abuse noted nearly 92,000 overdose related deaths in 2020 and there were 3,869 exposure-related fatalities reported nationwide to poison centers in 2020, an increase of 47.7% compared to 2019.¹⁴ Consistent with this, the number of deaths reported to the KSPCC increased by 22.2%, from 18 in 2020 to a record high 22 in 2021. Seventy-seven percent (n = 17) of these deaths were due to intentional ingestions. Interestingly, while opioids are leading cause of poisoning death nationwide, they were only identified in four fatal KSPCC cases.¹ This may be due to the fact that many opioid deaths occur out of hospital and were not reported to the KSPCC.

Several important limitations must be noted when interpreting poison center data. Reporting exposures to the KSPCC is voluntary and the KSPCC is not contacted regarding all poisonings in the state of Kansas. In particular, exposures with no or minimal effects may not be reported. Furthermore, in most cases, there is no objective confirmation of exposure.

Table 11. Medical outcome of human exposure cases by patient age.

Outcome	≤ 5 Years		6-12 Years		13-19 Years		≥ 20 Years		Unknown Child		Unknown Adult		Unknown Age		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
No effect	2,403	34.6	273	25.61	522	24.67	1,206	18.08	0	0	8	6.61	2	5.6	4,414	26.02
Minor effect*	947	13.63	255	23.92	761	35.96	1,816	27.22	0	0	21	17.36	1	2.8	3,801	22.41
Moderate effect*	109	1.57	60	5.63	437	20.65	1,207	18.09	0	0.00	2	1.65	0	0.0	1,815	10.70
Major effect*	19	0.27	7	0.66	83	3.92	348	5.22	0	0.00	0	0.00	0	0.0	457	2.69
Death	0	0.00	0	0.00	1	0.05	21	0.31	0	0.00	0	0.00	0	0.0	22	0.13
No follow-up, nontoxic	263	3.79	30	2.81	13	0.61	36	0.54	1	14.29	0	0.00	0	0.0	343	2.02
No follow-up, minimal toxicity	2,886	41.55	384	36.02	186	8.79	1,375	20.61	2	28.57	29	23.97	11	30.6	4,873	28.73
No follow-up, potentially toxic	191	2.75	35	3.28	78	3.69	311	4.66	4	57.14	48	39.67	21	58.3	688	4.06
Unrelated effect	128	1.84	22	2.06	35	1.65	351	5.26	0	0.00	13	10.74	1	2.8	550	3.24
Death, indirect report	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0	0	0.00
Total	6,946	100.00	1,066	100.00	2,116	100.00	6,671	100.00	7	100.00	121	100.00	36	100.00	16,963	100.00

Table 12. Medical outcome by reason for exposure in human exposures.

Outcome	Unintentional		Intentional		Other		Adverse Reaction		Unknown		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
No effect	3,462	28.97	897	20.60	17	14.05	25	6.10	13	10.32	4,414	26.02
Minor effect	2,203	18.43	1,440	33.07	32	26.45	110	26.83	16	12.7	3,801	22.41
Moderate effect	490	4.10	1,248	28.66	11	9.09	45	10.98	21	16.67	1,815	10.70
Major effect	47	0.39	377	8.66	0	0	8	1.95	25	19.84	457	2.69
Death	3	0.03	17	0.39	0	0.00	0	0.00	2	1.52	22	0.13
No follow-up, nontoxic	328	2.74	11	0.25	2	1.65	2	0.49	0	0	343	2.02
No follow-up, minimal toxicity	4,662	39.01	92	2.11	26	21.49	84	20.49	9	7.14	4,873	28.73
No follow-up, potentially toxic	423	3.54	214	4.92	11	9.09	24	5.85	16	12.70	688	4.06
Unrelated effect	334	2.79	58	1.33	22	18.18	112	27.32	24	19.05	550	3.24
Death, indirect report	0	0	0	0	0	0	0	0.00	0	0.00	0	0
Total	11,952	100.00	4,354	100.00	121	100.00	410	100.00	126	100.00	16,963	100.00

Table 13a. Decontamination provided in human exposures.*

Decontamination	N	%	N	%
Activated charcoal administered**	292	1.72	31	0.45
Cathartic	10	0.06	1	0.01
Lavage	3	0.02	0	0.00
Other emetic	110	0.65	45	0.65
Whole bowel irrigation	14	0.08	2	0.03
Total	429	2.53	79	1.14

*Total Human Exposures = 16,963; Total Exposures Children ≤ 5 years = 6,946

**Activated charcoal counts = Single and Multiple doses

Table 13b. Therapy provided in human exposures by age.

	≤ 5 Years	6-12 Years	13-19 Years	≥ 20 Years	Unknown Child	Unknown Adult	Unknown Age	Total
Decontamination								
Cathartic	1	0	2	7	0	0	0	10
Charcoal, multiple doses	3	0	10	10	0	0	0	23
Charcoal, single dose	28	10	112	119	0	0	0	269
Dilute/irrigate/wash	4,955	545	323	1,912	0	38	6	7,779
Food/snack	1,516	158	102	420	0	4	0	2,200
Fresh air	78	53	60	433	2	24	3	653
Ipecac	0	0	0	0	0	0	0	0
Lavage	0	0	0	1	0	0	0	1
Other emetic	45	5	17	42	0	0	0	110
Whole bowel irrigation	2	0	3	9	0	0	0	14
Other Therapies								
2-PAM	0	0	0	1	0	0	0	1
Alkalinization - Systemic	1	1	37	90	0	0	0	129
Alkalinization - Urinary	1	0	4	8	0	0	0	13
Antiarrhythmic	0	0	4	16	0	0	0	20
Antibiotics	17	8	14	206	0	2	0	247
Anticonvulsants	2	0	5	22	0	0	0	29
Antiemetics	19	13	248	289	0	0	0	569
Antihistamines	8	9	23	106	0	0	0	146
Antihypertensives	3	0	1	49	0	0	0	53
Antipsychotics	0	0	18	88	0	0	0	106
Antivenom (Immune Fab fragment) - Not Specified	1	1	6	20	0	0	0	28
Antivenom/antitoxin (Non-Fab) - Not Specified	0	0	0	1	0	0	0	1
Atropine	0	1	4	10	0	0	0	15
Benzodiazepines	21	11	154	419	0	0	0	605
Blood products	1	1	2	11	0	0	0	15
Bronchodilators	3	3	6	60	0	0	0	72
Calcium	76	7	8	47	0	0	0	138
Cardioversion	0	0	1	6	0	0	0	7
Continuous Renal Replacement Therapy	1	0	1	7	0	0	0	9
Cardiopulmonary resuscitation	0	0	5	25	0	0	0	30
Digoxin Immune Fab	0	0	0	3	0	0	0	3
Extracorporeal membrane oxygenation	1	0	0	0	0	0	0	1
Fluids, IV	67	52	655	1,441	0	0	0	2,215
Flumazenil	1	0	1	28	0	0	0	30
Folate	0	0	2	84	0	0	0	86
Fomepizole	0	0	0	16	0	0	0	16
Glucagon	0	0	5	33	0	0	0	38
Glucose, > 5%	2	0	10	67	0	0	0	79
Hemodialysis	1	0	3	21	0	0	0	25

Table 13b. Therapy provided in human exposures by age. *continued.*

	≤ 5 Years	6-12 Years	13-19 Years	≥ 20 Years	Unknown Child	Unknown Adult	Unknown Age	Total
Other Therapies								
Hemoperfusion	0	0	0	1	0	0	0	1
High Dose Insulin/ Glucose	0	0	0	9	0	0	0	9
Hydroxocobalamin	0	0	0	3	0	0	0	3
Hyperbaric oxygen	0	0	0	2	0	0	0	2
Hypothermia Protocol	0	0	0	7	0	0	0	7
Insulin	1	0	2	25	0	0	0	28
Intubation	5	4	26	166	0	0	0	201
L-Carnitine	0	0	1	2	0	0	0	3
Leucovorin	0	0	0	2	0	0	0	2
Lipid emulsion therapy	1	0	1	6	0	0	0	8
Magnesium	0	3	42	156	0	0	0	201
Methylene blue	0	0	1	4	0	0	0	5
N-acetylcysteine, IV	0	12	137	177	0	0	0	326
N-acetylcysteine, PO	0	2	16	18	0	0	0	36
Naloxone	13	3	33	190	0	0	0	239
Neuromuscular blocker	0	0	0	7	0	0	0	7
Octreotide	1	0	0	8	0	0	0	9
Opioid analgesia	1	5	11	97	0	0	0	114
Other	42	10	67	325	0	4	0	448
Oxygen	21	10	60	457	0	0	0	548
Pacemaker	0	0	0	10	0	0	0	10
Physostigmine	0	0	4	9	0	0	0	13
Phytonadione	0	0	2	17	0	0	0	19
Potassium	8	7	116	318	0	0	0	449
Potassium iodide	0	0	3	2	0	0	0	5
Propofol	1	0	17	123	0	0	0	141
Rabies immune globulin	0	0	0	2	0	0	0	2
Rabies vaccine	0	0	0	6	0	0	0	6
Sedation (other)	10	5	43	173	0	0	0	231
Sodium bicarbonate - metabolic acidosis	1	0	6	25	0	0	0	32
Sodium bicarbonate - nebulized	1	0	0	2	0	0	0	3
Steroids	7	4	14	87	0	1	0	113
Succimer	0	0	0	3	0	0	0	3
Surgical intervention	5	1	1	5	0	0	0	12
Thiamine	0	0	3	102	0	0	0	105
Vasopressors	2	0	10	112	0	0	0	124
Ventilation, Non-invasive (CPAP, BiPAP)	0	0	3	31	0	0	0	34
Ventilator	5	4	23	170	0	0	0	202

Table 15. 2015 to 2021 comparison of select statistics.

	2015	2016	2017	2018	2019	2020	2021
Total Cases	21,618	21,965	21,431	21,072	20,589	19,780	18,253
Calls from health care facility	4,267	4,514	4,892	5,224	5,195	4,771	5,005
Moderate or Major Outcomes	1,688	1,971	2,170	2,340	2,416	2,294	2,272
Deaths	13	15	16	7	14	18	22

CONCLUSIONS

The 2021 KSPCC annual report demonstrated that the center received over 18,200 total calls, including more than 16,900 human exposures. While pediatric exposures remain the most common, there continued to be a significant and increasing number of calls from healthcare facilities and for cases with serious outcomes. This report supported the continued value of the KSPCC to both public and acute healthcare in the state of Kansas.

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