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2020 Annual Report of the Kansas Poison Control Center at The University of Kansas Health System

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ABSTRACT

Introduction. This is the 2020 Annual Report of the Kansas Poison Control Center (KSPCC) at The University of Kansas Health System. The KSPCC receives calls from the public, law enforcement, healthcare professionals, and public health agencies.

Methods. Encounters reported to the KSPCC from January 1, 2020 through December 31, 2020 were analyzed for caller location, demographics, exposure substance, nature of exposure, route of exposure, interventions, medical outcome, and location of care. Encounters were classified as human or animal exposure, confirmed non-exposure, or information call (no exposure).

Results. There were 19,780 total encounters, including 18,492 human exposure cases. These cases were primarily female (53.6%, n = 9,911) and pediatric (19 years of age or less; 59.5%, n = 10,995). Acute cases (82.7%, n = 15,294), unintentional exposures (73.8%, n = 13,643), and ingestions (85.9%, n = 15,901) were most common. The most common reported substance was household cleaning products (n = 937) in pediatric (children ≤ 5) and analgesics (n = 1,335) in adults. An increase in exposures to disinfectants and household cleaning products was seen. Moderate (n = 1,812) or major (n = 482) clinical outcomes were seen in 12.4% of cases. There were 18 deaths in 2020 reported to the KSPCC.

Conclusions. Over 18,400 exposures were managed by the KSPCC in 2020. Pediatric exposures remained the most common encounter. An increase in exposures to disinfectants and other household cleaning products was seen. This report supported the continued value of the KSPCC to both public and acute healthcare in the state of Kansas.
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INTRODUCTION

This is the 2020 Annual Report of Kansas Poison Control Center (KSPCC) at The University of Kansas Health System. The KSPCC is a 24-hour, 365 day/year, healthcare 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 11 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, healthcare 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 6.51 ([6.12, 8.68]; 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, 2020 through December 31, 2020 are reported below.

METHODS

All KSPCC encounters recorded electronically in the Toxicall® data management system from January 1, 2020 to December 31, 2020 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 (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-healthcare facility or healthcare 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 19,780 total cases in 2020. This was a decrease of 809 cases (3.9%) compared to 2019. In 2020, there were 18,492 human exposure cases, 55 non-exposure confirmed cases, 104 animal exposure cases, and 1,129 information calls. For information calls, drug information (n = 324) was most common reason for calling. Table 1 describes the encounter types.

The KSPCC made 32,650 follow-up calls in 2020. Follow-up calls were done in 59.7% of human exposure cases. One follow-up call was made in 24.7% of human exposure cases and multiple follow-up calls (range 2-65) were made in 35.0% 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 3,101. In addition, calls were received from 47 other states, the District of Columbia, and Puerto Rico.

Overall, a majority of human exposure cases (53.6%, n = 9,911) were female. 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, 66.1% of cases were female. Approximately 59.5% (n = 10,995) of human exposures involved a child (defined as age 19 years or less).

Table 2 illustrates distribution of human exposures by age and gender. Patients two years 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. Seventy-one exposures occurred in pregnant women (0.4% of all human exposures). Of these exposures, 31.0% (n = 22) occurred in the first trimester, 43.7% (n = 31) occurred in the second trimester, and 19.7% (n = 14) occurred in the third trimester. Most exposures in pregnant women (73.2%, n = 52) were unintentional exposures, with 25.3% (n = 18) resulting from intentional exposures. There were no reported deaths to KSPCC in a pregnant woman in 2020.

Table 1. Encounter type.

	N	%
Exposure		
Human exposure	18,492	99.04
Animal exposure	104	0.56
Subtotal	**18,596**	**94.01**
Non-exposure confirmed cases		
Human non-exposure	55	100.00
Subtotal	**55**	**0.28**
Information call		
Drug information	324	28.70
Drug identification	55	4.87
Environmental information	74	6.55
Medical information	69	6.11
Occupational information	5	0.44
Poison information	124	10.98
Prevention/safety/education	10	0.89
Teratogenicity information		
Other information	32	2.83
Substance abuse	10	0.89
Administrative	44	3.90
Caller referred	382	33.84
Subtotal	**1,129**	**5.71**
Total	**19,780**	**100.00**

For human exposures, 67.3% (n = 12,448) of calls originated from a residence (own or other), while 92.8% (n = 17,177) of these exposures occurred at a residence (own or other). Calls from a healthcare facility accounted for 25.8% (n = 4,771) of human exposure encounters. Table 3 further details the origin of human exposure cases and the site of the exposure. Most human exposures, 82.7 % (n = 15,294), were acute cases defined as exposures occurring over eight hours or less. Chronic exposures, defined as exposures occurring over eight hours, accounted for 2.0% (373) of all human exposures. Acute on chronic exposures, defined as single exposure that was preceded by a chronic exposure over eight hours, totaled 2,675 (14.5%). Ingestion was the most common route of exposure (80.9%, n = 15.901) documented (Table 4).

The most common reported substance in those less than six years of age was household cleaning products (n = 937), followed closely by cosmetics/personal care products (n = 882). 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 = 1,335) and sedative/hypnotics/antipsychotics (n = 1,110) were the most frequently involved substances, as seen in Table 6. There was no change in the rank order of substances in adults. Among all encounters, analgesics (11.8%, n = 2,812) 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 online only at journals.ku.edu/kjm).

In 2020, there was a total of 369 plant exposures reported to the KSPCC. The single most common plant exposure encountered was to pokeweed (Phytolacca Americana; n = 39). Table 8 lists the top five most encountered plants.

Unintentional exposures were the most common reason for exposures (73.8%, n = 13,643), while intentional exposures accounted for 22.4% (n = 4,133) of exposures. Table 9 lists reasons for human exposures. Most unintentional exposures, 58.1% (n = 7,873) occurred in the ≤ 5-year-old age group. In patients less than 13 years of age, 97.7% (n = 8,814) of ingestions were unintentional. However, in the 13 to 19-year-old group, intentional exposure was most common (71.4%, n = 1,403). In total, suspected suicide attempts accounted for 17.3% (n = 3,207) of human encounters. When a therapeutic error was the reason for exposure, a double dose was the most common scenario (35.7%; n = 826).

Most encounters (65.8%, n = 12,174) were managed in a non-healthcare facility (i.e., a residence). Of the 5,998 encounters managed at a healthcare facility, 43.2% (n = 2,594) were admitted. Table 10 lists the management site of all human encounters.

Among human exposures, 14,756 involved exposures to pharmaceutical agents, while 8,926 involved exposure 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, 83.9% (n = 15,508) of all human exposures were exposed to only a single substance. Among these single substance exposures, the reason for exposure was intentional in 26.2% (n = 2,113) of pharmaceutical-only cases, compared to 4.0% (n = 300) of non-pharmaceutical single substance exposures.

When medical outcomes were analyzed, 25.2% (n = 4,659) of human exposures had no effect, 20.0% (n = 3,696) had minor effect, 9.8% (n = 1,812) had moderate effect, and 2.6% (n = 482) 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 11.1% (n = 2) of the fatalities. Table 11 lists all medical outcomes by age and Table 12 lists outcomes by reason for exposure.

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

	Male		Female		Unknown Gender		Total		Cumulative Total	
Age	N	% of age group total	N	% of age group total	N	% of age group total	N	% of total exposure	N	%
< 1 year	448	50.79	432	48.98	2	0.23	882	4.77	882	4.77
1 year	1,289	52.74	1,151	47.09	4	0.16	2,444	13.22	3,326	17.99
2 years	1,334	52.83	1,186	46.97	5	0.20	2,525	13.65	5,851	31.64
3 years	622	54..85	511	45.06	1	0.09	1,134	6.13	6,985	37.77
4 years	330	56.99	248	42.83	1	0.17	579	3.13	7,564	40.90
5 years	199	54.97	161	44.48	2	0.55	362	1.96	7,926	42.86
Unknown ≤ 5 years	0	0.00	1	50.00	1	50.00	2	0.01	7,928	42.87
Child 6-12 years	609	55.72	477	43.64	7	0.64	1,093	5.91	9,021	48.78
Teen 13-19 years	662	33.72	1,297	66.07	4	0.20	1,963	10.62	10,984	59.40
Unknown child	4	36.36	3	27.27	4	36.36	11	0.06	10,995	59.46
Subtotal	**5,497**	**50.00**	**5,467**	**49.72**	**31**	**0.28**	**10,995**	**59.46**	**10,995**	**59.46**
20-29 years	842	44.43	1,052	55.51	1	0.05	1,895	10.25	12,890	69.71
30-39 years	678	42.14	927	57.61	4	0.25	1,609	8.70	14,449	78.41
40-49 years	411	36.60	712	63.40	0	0.00	1,123	6.07	15,622	84.48
50-59 years	399	39.39	612	60.41	2	0.20	1,013	5.48	16,635	89.96
60-69 years	309	37.41	517	62.59	0	0.00	826	4.47	17,461	94.42
70-79 years	199	38.42	319	61.58	0	0.00	518	2.80	17.979	97.23
80-89 years	113	38.44	181	61.56	0	0.00	294	1.59	18,273	98.82
≥ 90 years	26	34.67	49	65.33	0	0.00	75	0.41	18,348	99.22
Unknown adult	49	41.88	67	57.26	1	0.85	117	0.63	18,465	99.85
Subtotal	**3,026**	**40.51**	**4,436**	**59.38**	**8**	**0.11**	**7,470**	**40.40**	**18,465**	**99.85**
Unknown age	12	44.44	8	29.63	7	25.93	27	0.15	18,492	100.00
Total	**8,535**	**46.16**	**9,911**	**53.60**	**46**	**0.25**	**18,492**	**100.00**	**18,492**	**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	12,145	65.68	16,671	90.15
Other	303	1.64	506	2.74
Workplace	212	1.15	380	2.05
Healthcare facility	4,771	25.80	96	0.52
School	17	0.09	106	0.57
Restaurant/food service	0	0.00	28	0.15
Public area	80	0.43	156	0.84
Other	923	4.99	231	1.25
Unknown	41	0.22	318	1.72

Table 4. Route of human exposures.*

	Human Exposures		
Route	**N**	**% of all routes**	**% of all cases**
Ingestion	15,901	80.86	85.99
Dermal	1,413	7.19	7.64
Inhalation/nasal	1,170	5.95	6.33
Ocular	671	3.41	3.63
Bite/sting	162	0.82	0.88
Parenteral	168	0.85	0.91
Unknown	123	0.63	0.67
Aspiration (with ingestion)	13	0.07	1.00
Otic	22	0.11	0.12
Other	10	0.05	0.05
Vaginal	5	0.03	0.03
Rectal	6	0.03	0.03
Total number of routes	**19,664**	**100.00**	**106.34**

*Some 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)	2	937	11.20	902	11.85
Cosmetics/personal care products	1	882	10.54	857	11.26
Analgesics	3	712	8.51	625	8.21
Dietary supplements/herbals/homeopathic	6	547	6.54	523	6.87
Foreign bodies/toys/miscellaneous	4	486	5.81	466	6.12
Antihistamines	5	441	5.27	394	5.18
Vitamins	8	409	4.89	355	4.66
Topical preparations	7	365	4.36	352	4.63
Pesticides	9	301	3.60	281	3.69
Plants	12	210	2.51	206	2.71
Gastrointestinal preparations	10	210	2.51	178	2.34
Cardiovascular drugs	11	194	2.32	113	1.48
Electrolytes and minerals	14	175	2.09	162	2.13
Hormones and hormone antagonists	13	159	1.90	122	1.60
Arts/crafts/office supplies*	16	146	1.75	136	1.79

*Essential oils 15 previous year

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

Substance Category	All Substance	%	Single Substance Exposures	%
Analgesics	1,335	11.78	555	10.17
Sedative/hypnotics/antipsychotics	1,110	9.80	304	5.57
Antidepressants	931	8.22	294	5.39
Cardiovascular drugs	808	7.13	235	4.31
Alcohols	627	5.53	71	1.30
Antihistamines	503	4.44	194	3.56
Cleaning substances (household)	529	4.67	408	7.48
Pesticides	392	3.46	314	5.76
Anticonvulsants	430	3.79	108	1.98
Hormones and hormone antagonists	366	3.23	188	3.45
Stimulants and street drugs	285	2.52	114	2.09
Fumes/gases/vapors	267	2.36	230	4.22

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

Substance Category	All Substance	%	Single Substance Exposures	%
Chemicals	229	2.02	193	3.54
Muscle relaxants	207	1.83	61	1.12
Cold and cough preparations	199	1.76	93	1.70

Table 8. Top 5 most frequent plant exposures.

Botanical Name or Category	N
Phytolacca americana (L.) (Botanic name)	39
Plants: non-toxic	33
Oxalates (Species unspecified)	31
Cherry (Species unspecified, wild & domesticated)	28
Plants-general-unknown	17
Total of all plant calls	369

Table 9. Reason for human exposure cases.

Unintentional	N	%
Unintentional - general	8,540	46.02
Unintentional - therapeutic error	2,309	12.05
Unintentional - misuse	1,713	9.03
Unintentional - environmental	474	2.06
Unintentional - occupational	284	1.05
Unintentional - bite/sting	163	0.09
Unintentional - food poisoning	136	0.07
Unintentional - unknown	24	0.01
Subtotal	**13,643**	**73.08%**
Intentional		
Intentional - suspected suicide	3,207	17.03
Intentional - misuse	469	2.05
Intentional - abuse	358	1.09
Intentional - unknown	99	0.05
Subtotal	**4,133**	**22.04%**
Adverse reaction		
Adverse reaction - drug	346	1.09
Adverse reaction - food	76	0.04
Adverse reaction - other	63	0.03
Subtotal	**485**	**2.06%**
Unknown		
Unknown reason	132	0.07
Subtotal	**132**	**0.07%**
Other		
Other - malicious	57	0.03
Other - withdrawal	22	0.01
Other - contamination/tampering	20	0.01
Subtotal	**99**	**0.05%**
Total	**18,492**	**100.00**

Table 10. Management site of human exposures.

Site of Management	N	%
Managed in healthcare facility		
Treated/evaluated and released	3,153	17.01
Admitted to critical care unit	1,230	6.07
Admitted to noncritical care unit	722	3.09
Admitted to psychiatric facility	642	3.05
Patient lost to follow-up/left AMA	251	1.04
Subtotal (managed in healthcare facility)	**5,998**	**32.04**
Managed on site, non-healthcare facility	12,174	65.08
Other	40	0.02
Refused referral	260	1.04
Unknown	20	0.01
Total	**18,492**	**100.00**

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

	≤ 5 Years		6-12 Years		13-19 Years		≥ 20 Years		Unknown Child		Unknown Adult		Unknown Age		Total	
Outcome	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
No effect	2,692	33.96	276	25.25	457	23.28	1,225	16.66	1	9.09	7	5.98	1	3.07	4,659	25.19
Minor effect	946	11.93	226	20.68	649	33.06	1,854	25.21	4	36.36	16	13.68	1	3.07	3,696	19.99
Moderate effect	107	1.35	59	5.40	427	21.75	1,217	16.55	0	0.00	2	1.71	0	0.00	1,812	9.80
Major effect	13	0.16	1	0.09	87	4.43	381	5.18	0	0.00	0	0.00	0	0.00	482	2.61
Death	0	0.00	0	0.00	1	0.05	16	0.22	0	0.00	0	0.00	0	0.00	17	0.09
No follow-up, nontoxic	259	3.27	30	2.74	5	0.25	48	0.65	0	0.00	3	2.56	1	3.07	346	1.87
No follow-up, minimal toxicity	3,639	45.90	462	42.27	224	11.41	1,836	24.97	4	36.36	43	36.75	7	25.09	6,215	33.61
No follow-up, potentially toxic	204	2.57	21	1.92	83	4.23	377	5.13	2	18.18	34	29.06	15	55.06	736	3.98
Unrelated effect	68	0.86	18	1.65	30	1.53	399	5.43	0	0.00	12	10.26	1	3.07	528	2.86
Death, indirect report	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.07	1	0.01
Total	**7,928**	**100.00**	**1,093**	**100.00**	**1,963**	**100.00**	**7,353**	**100.00**	**11**	**100.00**	**117**	**100.00**	**27**	**100.00**	**18,492**	**100.00**

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

	Unintentional		Intentional		Other		Adverse Reaction		Unknown		Total	
Outcome	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
No effect	3,801	27.86	807	19.53	8	8.08	31	6.39	12	9.09	4,659	25.19
Minor effect	2,295	16.82	1,255	30.37	15	15.15	108	22.27	23	17.42	3,696	19.99
Moderate effect	470	3.44	1,240	30.00	10	10.10	67	13.81	25	18.94	1,812	9.80
Major effect	47	0.34	401	9.70	5	5.05	7	1.44	22	16.67	482	2.61
Death	5	0.04	10	0.24	0	0.00	0	0.00	2	1.52	17	0.09
No follow-up, nontoxic	328	2.40	12	0.29	1	1.01	4	0.82	1	0.76	346	1.87
No follow-up, minimal toxicity	5,941	43.55	136	3.29	22	22.22	109	22.47	7	5.30	6,215	33.61
No follow-up, potentially toxic	452	3.31	219	5.30	17	17.17	25	5.15	23	17.42	736	3.98
Unrelated effect	303	2.22	53	1.28	21	21.21	134	27.63	17	12.88	528	2.86
Death, indirect report	1	0.01	0	0.00	0	0.00	0	0.00	0	0.00	1	0.01
Total	**13,643**	**100.00**	**4,133**	**100.00**	**99**	**100.00**	**485**	**100.00**	**132**	**100.00**	**18,492**	**100.00**

Use of decontamination and specific therapies, including antidotal therapy, is detailed in Tables 13a and 13b. There were 18 deaths in 2020 reported to the KSPCC. All but one death involved patients 20 years of age or older, and ten of the deaths involved intentional exposures. There was one death in a 13-year-old. Table 14 details the 18 reported deaths (available online only at journals.ku.edu/kjm).

Table 15 compares key statistics from 2015 to 2020. Overall case volumes have declined since 2016. There was also a slight decline in calls from healthcare facilities in 2020. The number of deaths increased from 2019 to 2020.

Table 13a. Decontamination provided in human exposures.[1]

Decontamination	N	%	N	%
Activated charcoal administered[2]	270	1.46	29	0.37
Cathartic	17	0.09	5	0.06
Ipecac administered	2	0.01	1	0.01
Lavage	1	0.01	0	0.00
Other emetic	143	0.77	60	0.76
Whole bowel irrigation	10	0.05	0	0.00
Total	**443**	**2.40**	**95**	**1.20**

[1]Total human exposures = 18,492; Total exposures in children ≤ 5 years = 7,928.
[2]Activated charcoal counts = single and multiple doses.

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

Therapy	≤ 5 Years	6-12 Years	13-19 Years	≥ 20 Years	Unknown Child	Unknown Adult	Unknown Age	Total
Decontamination								
Cathartic	5	4	2	6	0	0	0	17
Charcoal, multiple doses	0	0	6	5	0	0	0	11
Charcoal, single dose	29	5	99	126	0	0	0	259
Dilute/irrigate/wash	5,956	594	363	2,400	5	38	3	9,359
Food/snack	1,741	157	84	438	0	3	0	2,423
Fresh air	74	41	64	530	5	16	2	732
Ipecac	1	0	0	1	0	0	0	2
Lavage	0	0	0	1	0	0	0	1
Other emetic	60	3	15	65	0	0	0	143
Whole bowel irrigation	0	1	0	9	0	0	0	10
Other therapies						0	0	0
Alkalinization - systemic	0	0	35	94	0	0	0	129
Alkalinization - urinary	1	0	6	11	0	0	0	18
Amyl nitrite	0	0	0	1	0	0	0	1
Antiarrhythmic	1	0	3	13	0	0	0	17
Antibiotics	18	7	23	181	0	0	0	229
Anticonvulsants	0	0	2	15	0	0	0	17
Antiemetics	18	16	207	243	0	0	0	484
Antifungals	0	0	0	1	0	0	0	1
Antihistamines	14	11	29	82	0	0	0	136
Antihypertensives	0	0	4	22	0	0	0	26
Antipsychotics	0	1	8	52	0	0	0	61
Antivenom (immune fab fragment) – not specified	1	3	1	18	0	0	0	23
Antivenom - elapidae	0	0	0	2	0	0	0	2

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

Therapy	≤ 5 Years	6-12 Years	13-19 Years	≥ 20 Years	Unknown Child	Unknown Adult	Unknown Age	Total
Other therapies						0	0	0
Antivenom/antitoxin (non-fab) – not specified	0	0	0	1	0	0	0	1
Atropine	2	2	4	12	0	0	0	20
Benzodiazepines	18	7	126	388	0	0	0	539
Blood products	0	0	1	4	0	0	0	5
Calcium	71	6	1	48	0	0	0	126
Cardioversion	0	0	0	1	0	0	0	1
Continuous Renal Replacement Therapy (CRRT)	0	0	0	6	0	0	0	6
CPR	0	0	3	12	0	0	0	15
Deferoxamine	0	0	2	0	0	0	0	2
ECMO	0	0	0	2	0	0	0	2
EDTA	1	0	0	0	0	0	0	1
Fluids, IV	62	44	629	1,509	0	0	0	2,244
Flumazenil	0	0	5	29	0	0	0	34
Folate	0	0	1	50	0	0	0	51
Fomepizole	0	0	0	9	0	0	0	9
Glucagon	2	0	2	25	0	0	0	29
Glucose, > 5%	3	0	4	38	0	0	0	45
Hemodialysis	0	0	2	14	0	0	0	16
Hemoperfusion	0	0	1	0	0	0	0	1
High dose insulin/glucose	0	0	0	8	0	0	0	8
Hydroxocobalamin	0	0	0	3	0	0	0	3
Hyperbaric oxygen	0	0	0	9	0	0	0	9
Hypothermia protocol	0	0	0	2	0	0	0	2
Insulin	1	0	0	32	0	0	0	33
Intubation	3	1	27	160	0	0	0	191
L-Carnitine	1	0	1	4	0	0	0	6
Leucovorin	0	0	0	1	0	0	0	1
Lipid emulsion therapy	0	0	2	2	0	0	0	4
Magnesium	0	0	40	141	0	0	0	181
Methylene blue	0	0	1	3	0	0	0	4
NAC, IV	1	13	96	174	0	0	0	284
NAC, PO	0	4	20	22	0	0	0	46
Naloxone	17	2	38	175	0	0	0	232
Neuromuscular blocker	0	0	2	21	0	0	0	23
Octreotide	2	0	1	5	0	0	0	8
Opioid analgesia	2	0	6	27	0	0	0	35
Other	36	32	75	323	0	4	0	470
Oxygen	6	5	50	402	0	0	0	463
Pacemaker	0	0	0	4	0	0	0	4
Physostigmine	1	0	2	3	0	0	0	6
Phytonadione	0	0	0	12	0	0	0	12

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

Therapy	≤ 5 Years	6-12 Years	13-19 Years	≥ 20 Years	Unknown Child	Unknown Adult	Unknown Age	Total
Potassium	3	2	119	295	0	0	0	419
Potassium iodide	0	0	1	3	0	0	0	4
Propofol	2	0	12	102	0	0	0	116
Rabies immune globulin	0	0	0	5	0	0	0	5
Rabies vaccine	0	1	0	6	0	0	0	7
Sedation (other)	6	2	35	143	0	0	0	186
Sodium Bicarbonate - metabolic acidosis	1	0	4	15	0	0	0	20
Sodium Bicarbonate - nebulized	0	0	0	2	0	0	0	2
Steroids	9	2	9	65	0	0	0	85
Succimer	7	1	0	2	0	0	0	10
Surgical intervention	1	0	1	2	0	0	0	4
Thiamine	0	0	2	75	0	0	0	77
Vasopressors	2	0	13	72	0	0	0	87
Ventilation, non-invasive (CPAP, BiPAP)	0	0	1	14	0	0	0	15
Ventilator	3	1	26	171	0	0	0	201

Table 15. 2015 to 2020 comparison of select statistics.

	2015	2016	2017	2018	2019	2020
Total cases	20,109	21,965	21,431	21,072	20,589	19,780
Calls from healthcare facilities	4,267	4,514	4,892	5,224	5,195	4,771
Moderate or major outcomes	1,688	1,971	2,170	2,340	2,416	2,294
Deaths	13	15	16	7	14	18

DISCUSSION

The ongoing importance of the KSPCC is reflected in trends that have seen rates of poisonings and overdoses increase at an alarming rate over the last decade. According to the Annual Surveillance Report of Drug-Related Risks and Outcomes, drug poisoning-related hospitalizations in the United States have increased 26% over the last two years that data were available.[2,3] The National Center for Health Statistics noted over 70,000 overdose related deaths in 2019.[4] Similarly, the KSPCC consistently has seen an increase in the number of cases from healthcare facilities and cases with moderate or major medical outcomes. Since 2015, calls from healthcare facilities have increased by 11.8%, with a slight decrease in calls from healthcare facilities in 2020 compared to 2019.

Cases from healthcare facilities still account for approximately 25% of the cases reported to the KSPCC.[5-8] Moderate/major outcomes have increased steadily by 36% since 2015. The percent of cases with a moderate/major outcome was 10.1% of overall cases in 2015 compared to 2020 where these cases account for 11.6% of overall case volume. The decrease in calls from healthcare facilities in 2020 partially may be explained by the impact of COVID-19 on hospital's patient volumes. The most apparent decreases in call volumes were in the months of August to December of 2020. However, the KSPCC also noticed an increase in calls regarding cleaning substances and disinfectants in 2020 compared to prior years. This was substantial enough that cleaning substances and disinfectants became the number one substance category involved in exposures in children ≤ 5 years and increased by 19% in adults compared to 2019.[7] In total, the KSPCC saw a 30% increase in calls regarding bleaches, 46% increase in household disinfectants, and 35% increase in calls regarding hand sanitizers compared to 2019. The number of deaths reported to the KSPCC increased by 28.6%, from 14 in 2019 to 18 in 2020. With the exception of 2018, there has been a steady increase in the number of deaths reported since 2015.[5-8]

The 2020 KSPCC statistics continued to mirror those seen nationally by the other 54 accredited poison control centers nationwide. In 2019, 2,573,180 encounters were logged by poison control, including 2,148,141 human exposures.[1] Overall, encounters showed a 1.70% (n = 42,942) increase from 2018 to 2019, while healthcare facility human exposure cases remained nearly steady with a slight decrease of 0.495%. More serious outcomes (moderate, major, or death) continued to increase. Nationwide, the five substance classes most frequently involved in all human exposures were analgesics, household cleaning substances, cosmetics/personal care products, antidepressants, and sedatives/hypnotics/antipsychotics, while the top five most common

exposures in children age 5 years or less were cosmetics/personal care products, household cleaning substances, analgesics, foreign bodies/toys/miscellaneous, and dietary supplements/herbals/homeopathic.

National poison center data demonstrated that calls regarding household cleaners and disinfectants increased by 20.4% and 16.4%, respectively, just from January to March 2020 (the onset of the COVID-19 pandemic).[9] In May of 2020, an internet survey on knowledge and cleaning practices surrounding COVID-19 showed that 60% of participants had increased the frequency of home cleaning, and 39% indicated they had engaged in high-risk practices not recommended by either the U.S. Centers for Disease Control and Prevention or manufacturer (e.g., gargling or drinking diluted bleach solutions, misting body with a disinfectant product or spray).[10] Finally, there were 2,619 exposure-related fatalities reported nationwide in 2019.

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.

CONCLUSIONS

The 2020 KSPCC annual report demonstrated that the center received over 19,700 total calls, including more than 18,400 human exposures. While pediatric exposures remain the most common, there continues to be a significant number of calls from healthcare facilities and for cases with serious outcomes. COVID-19 appears to have impacted the type of calls received in 2020, with an increase in exposures to disinfectants and other household cleaning products. The experience of the KSPCC remains similar to national data. This report supported the continued value of the KSPCC to both public and acute healthcare in the state of Kansas.

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