

National Battery Ingestion Hotline

1-800-498-8666

July 1, 2022 to June 30, 2023 Annual Report

Rocky Mountain Poison Center

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EXECUTIVE SUMMARY

This report summarizes 2,159 human battery exposures reported to the Rocky Mountain Poison Center's National Battery Ingestion Hotline (NBIH) during the 12-month period from July 1, 2022, through June 30, 2023. Of this total, 1,175 of these cases specifically involved ingestion or suspicion of ingestion of one or more **disc** batteries. This is a slight drop (2.7%) from the previous contract year's total. See Figure 1 for case volume characterization during this 1-year period.

We compared the National Battery Ingestion Hotline disc battery ingestion data (Table 1) to the National Poison Data System (NPDS) (Table 2) over the same time period. Nationally, when 749 "confirmed non-ingestion" cases were removed from total case counts, there were a total of 2,784 human ingestion exposures involving disc batteries: 1,701 (61%) specifically involving children 0-5 years of age. Similar to the NBIH data, the most common age in this range was 1-year old (n=571) followed by 2-year-old children (n=426). In the age range of 6-12 years there were 337 cases. For teenagers (13-19 years) there were 116 cases. For cases involving 20 to 59-year-old adults, there were 207 cases, and there were 339 (12% of all disc battery ingestion exposures) cases involving adults *greater than* 60 years. Comparing these findings to the previous year (when "confirmed non-ingestion" cases are removed), disc battery ingestion nationally was **up** overall by 1% (2,754 exposures in previous contract year when 659 "confirmed non-ingestion" cases were removed).

Regarding exposures to disc battery ingestion reported to NPDS nationally (Table 2), medical outcomes included 1,324 cases with no effects, 220 with minor effects, 74 with moderate effects, and 26 with major effects. There were 6 deaths reported (2 reported directly to the NBIH, and 4 by indirect reports in which there was no poison center involvement with the care of the patient). Of note, 82% of cases were either referred to or originated from healthcare facilities (HCF).

In children aged 0-5 years, there were 1,701 disc battery ingestion exposures (excluding 651 "confirmed non-ingestion" cases) reported to NPDS during this same time period (Table 3). This age group represents 61% of total disc battery ingestions reported nationally. Medical outcomes included 814 with no effects, 104 with minor effects, 40 with moderate effects, and 22 with major effects. There were 2 deaths reported and 4 "indirect" deaths mentioned above in this age group. 84% of cases were either referred to or originated from healthcare facilities.

Figure 2 shows a slight downward trend over the past 5-year period in total human exposures to disc battery ingestion as well as major outcomes and fatalities. We suspect this difference continues to represent the general downward volume of calls to poison control centers paired with increased efforts at prevention campaigns to raise public awareness of the hazards of battery ingestion. Like the prior year, Table 4 shows that a slight majority (53%) of exposures in

the fifth contract year involved male patients. Again, the most common age associated with reported cases was one year old followed by two years of age (Table 1). This follows age of patients' trends from previous years and was the same for disc battery ingestion and all types of batteries and routes (Figure 3). Additionally, it appears as though case numbers drop in patients who are 40-59 years old but start to rise slightly for patients who are 60 years and over, with a bump in the 70–79-year age group. This is likely due to exposures involving disc batteries used to power hearing devices as well as the smaller sizes of those disc batteries being mistaken for pills or food. These types of “therapeutic errors” decreased significantly (57%) from the previous contract year. Therapeutic errors represented 4% (n=48) of all disc battery confirmed or suspected ingestions, all occurring in the adult age range with 81% specifically in the 60 years old and above group. Of all disc battery confirmed or suspected ingestions, the disc battery type was unknown in 36% of cases (Figure 4). 30% of cases involved alkaline disc batteries while another 23% of cases involved zinc-air batteries and 10% involving lithium coin cell batteries. Only 1% of cases involved silver oxide disc batteries. Table 5 demonstrates the geographical location of the caller when known. The top 3 states with the highest number of callers were California (264), Texas (251), and Florida (173). This is not surprising as these three states are in the top 5 most populated states according to US Census numbers. There were also 65 calls that originated from Canada. There were a small number of calls that originated from other countries around the world (Table 5). The most common caller site was the caller's own residence (76%) followed by healthcare facilities (15%) (Figure 5).

There were 1,175 cases where **disc battery ingestion** was initially confirmed or suspected. The most common medical outcome (Figure 6) associated with disc battery ingestion was no effect (n=582) followed by minor (n=102), moderate effect (n=32), and major effect (n=3). Following-up for medical outcomes was part of standard case-handling, but for a variety of reasons was not always possible. Of the total cases, 127 were lost to follow-up. For medical outcomes stratified by disc battery type, see Figures 7 and 8 for different data visualization options. Additionally, the breakdown of cumulative exposures to disc battery by types and medical outcomes are shown in Figures 9 and 10 that start from Contract Year 1 (July 1, 2018) to the end of Contract Year 5 (June 30, 2023). There were 2 fatalities directly reported to the National Battery Ingestion Hotline by health care providers and 1 fatality that was considered an “indirect report” as the NBIH was informed of the death after it occurred and was not directly involved with the care of the patient. See Table 6 for details of the 3 fatalities as well as the 3 cases that resulted in a Major outcome. Unfortunately, the disc battery type involved in all cases resulting in major outcome or fatality was not known at the time of the call. There were 298 cases where it was later confirmed that there was no exposure after all (battery was eventually located) and there were 28 cases where the caller reported signs and symptoms judged unrelated to battery exposure by the Specialist in Poison Information.

A total of 2,159 human exposures were reported to NBIH during the fifth contract year. Disc batteries were the most common battery type involved in human exposures (n=1202). 877 exposures involved actual disc battery exposure by mouth, 298 were later determined to be confirmed non-exposures, 4 cases involved dermal exposure, 19 were inhalational or nasal exposures, and 4 involved otic insertion. The percentage of cylindrical alkaline battery exposure cases from total human battery exposure cases reported to the NBIH was 44% (n=945), which is higher than the previous contract year (25%). Other battery types involved in human exposures aside from disc and cylindrical batteries were 9-volt batteries, automotive batteries, and batteries not otherwise specified. When the source of the battery was known (Figure 11), hearing aids (292) were the most common devices associated with human battery exposures. Of note, 427 cases of battery exposure were associated with cases where the devices were unknown. Disc battery access from games and toys were frequently involved in cases of disc battery ingestion (199). The most common size of disc batteries associated with human exposures when known, were 10-14 mm (331) and batteries under 10 mm (331), ≥ 20 mm (105), and 15-19 mm (9). Unfortunately, for 399 of cases, the battery size was unknown or not able to be determined (Figure 12).

Similar to our findings from previous reports, the ingestion of disc batteries was previously thought to be a public health issue regarding children (0-5 years). While case counts for patients greater than 60 years of age are significantly fewer than previous years, the National Battery Ingestion Hotline data demonstrate that accidental disc battery ingestion is not just a pediatric concern. Accidental disc battery ingestion can affect all ages; young, old, and everywhere in the middle. We are hopeful that the trend of disc battery ingestion decreases next year and the years to come, as well as reducing the numbers of cases with more serious or fatal outcomes. We will continue to actively support harm reduction measures and initiatives and campaigns that prevent accidental exposures to disc batteries.

Prevention tips are available at <https://www.rmpds.org/mechanism-and-safety-tips.html>. For data prior to July 1, 2018, statistics can be found at www.poison.org/battery/stats.asp. Cases may be reported 24/7/365 to the National Battery Ingestion Hotline at 1-800-498-8666 for immediate and expert medical advice.

Acknowledgements: Lynn Antony for her clerical assistance in the preparation of this report.

Appendix of Tables and Figures

Table 1. National Battery Ingestion Hotline Human Exposures by Age Range, Gender, and Disc Battery Ingestion, July 2022 to June 2023

Age	Female	Male	Unknown gender	All routes, all types of batteries	Disc Battery Ingestion Cases
<1 year	64	72	3	139	63
1 year	207	240	2	449	247
2 years	141	206	4	351	180
3 years	67	133	2	202	103
4 years	43	83	0	126	71
5 years	30	51	1	82	45
Unknown age but ≤ 5years	0	1	3	4	0
6 to 12 years	56	172	0	228	123
13 to 19 years	63	40	2	105	36
Unknown Child (≤ 19 years)	2	6	3	11	5
20-29 years	37	40	0	77	17
30-39 years	27	39	0	66	23
40-49 years	27	13	0	40	14
50-59 years	15	17	0	32	20
60-69 years	23	29	0	52	40
70-79 years	48	30	0	78	72
80-89 years	31	38	0	69	63
>= 90 years	24	11	0	35	34
Unknown Adult (≥20 years)	25	16	0	41	13
Unknown Age	6	7	3	16	6
Total:	936	1,244	23	2,203*	1175

*Represents total number of batteries involved, not case count. Some cases involve more than 1 battery.

Figure 1. National Battery Ingestion Hotline Case Volume Characterization, July 2022 to June 2023

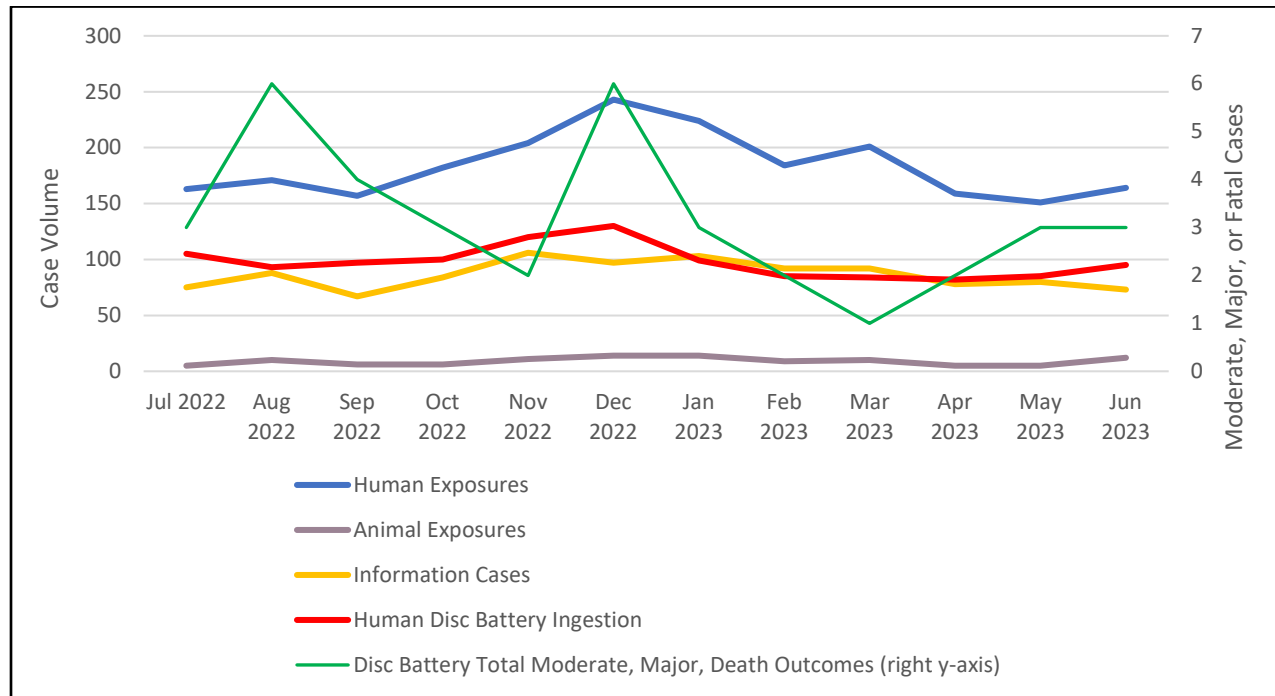


Table 2. National Poison Data System, Human Disc Battery Ingestion Exposures and Outcomes, July 2022 to June 2023, All Ages

Total Number of Ingestions	Age 0-5y	Age 6-12y	Age 13-19y	Age 20-59y	Age > 60y	% Treated or referred to HCF	No Effect	Minor Effect	Moderate Effect	Major Effect	Death
2,784 (excludes 749 'confirmed nonexposures')	1,701	337	116	207	339	82	1,324	220	74	26	6*

HCF = healthcare facility

*4 of the deaths was by *indirect* report to regional poison centers, not direct poison center consultation, both were in the age 0-5 year age range (shown below).

Data used by permission: American Association of Poison Control Centers, National Poison Data System. www.aapcc.org. [accessed on 9/23/2023].

Table 3. National Poison Data System, Human Disc Battery Ingestion Exposures and Outcomes, July 2022 to June 2023, Age 0 to 5 years

Number of Ingestions	% Treated or referred to HCF	No Effect	Minor	Moderate	Major	Death
1,701 (excludes 651 'confirmed nonexposures')	84	814	104	40	22	6*

HCF = healthcare facility

*4 of the deaths was by *indirect* report to regional poison centers, not direct poison center consultation.

Data used by permission: American Association of Poison Control Centers, National Poison Data System. www.aapcc.org. [accessed on 9/23/2023].

Figure 2. 5-Year Trend of National Battery Ingestion Hotline, July 2018 to June 2023

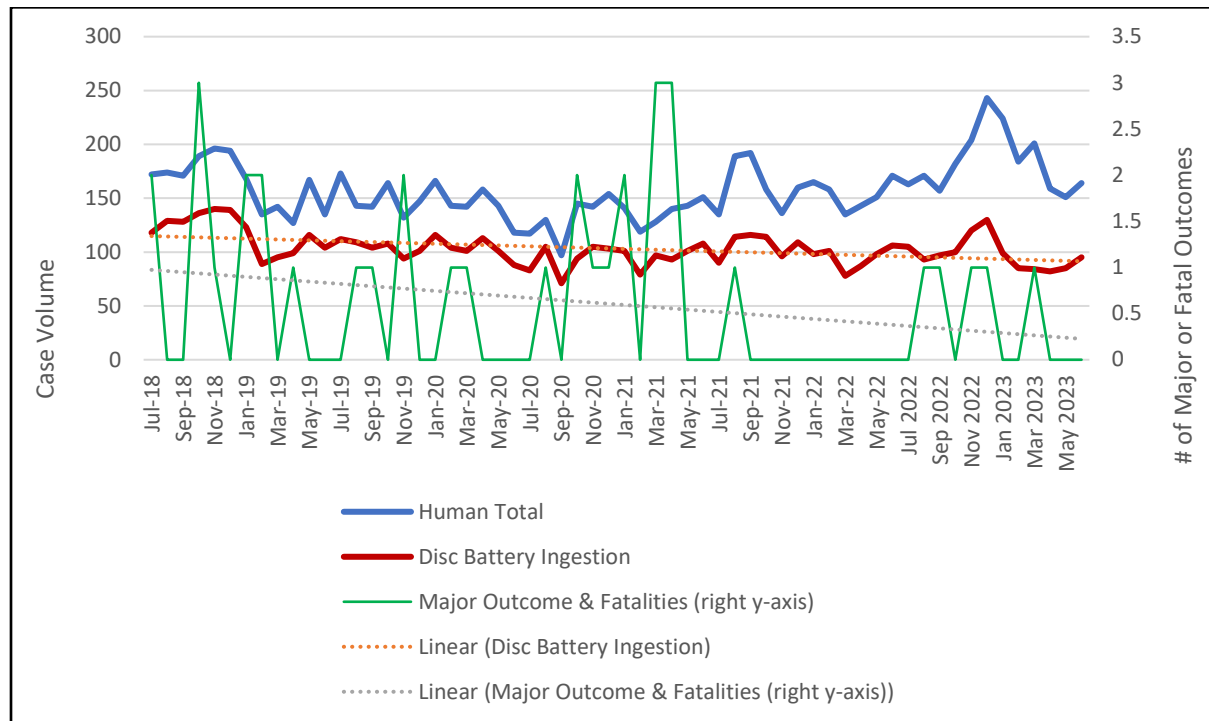


Table 4. Battery Hotline Human Disc Battery Ingestions by Gender, July 2022 to June 2023

Gender	Number of Exposures
Male	618
Female	541
Unknown	16

Figure 3. Human Battery Exposure by Age Range and Type Reported to the National Battery Ingestion Hotline, July 2022 to June 2023

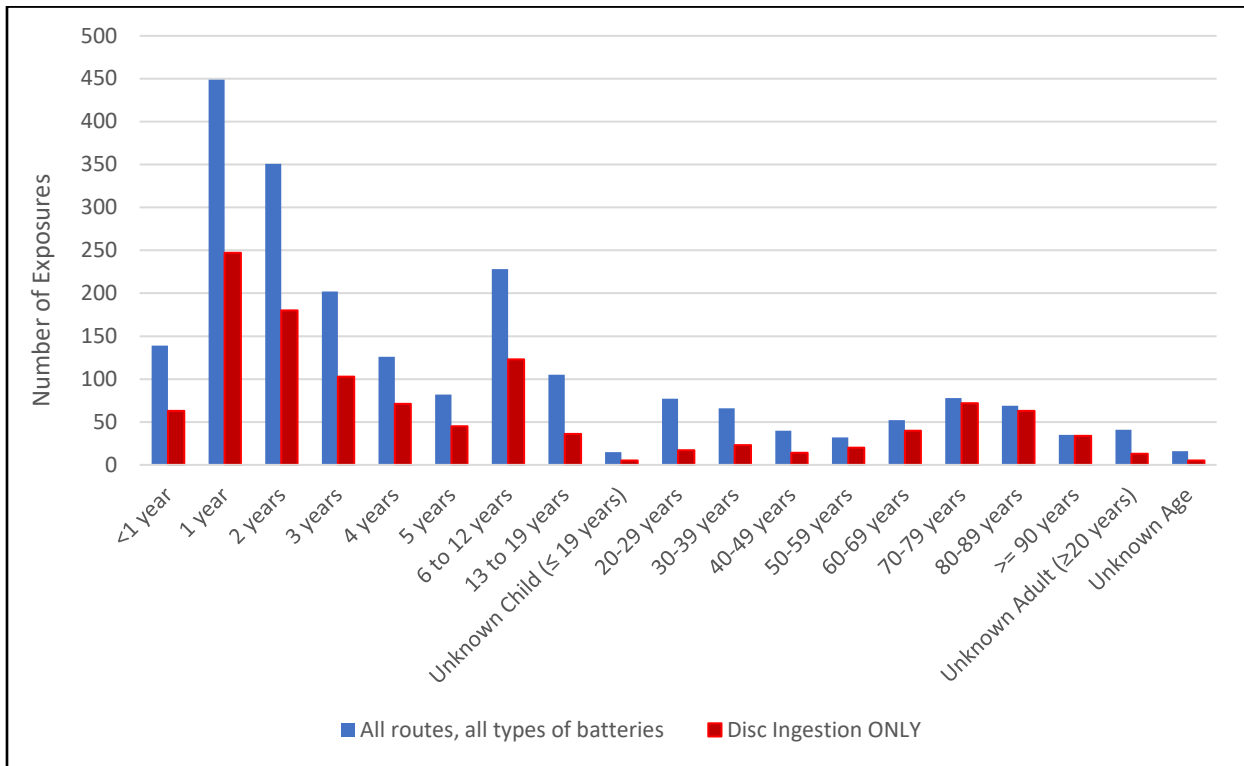


Figure 4. Disc Battery Ingestion by Types Reported to the National Battery Ingestion Hotline, July 2022 to June 2023

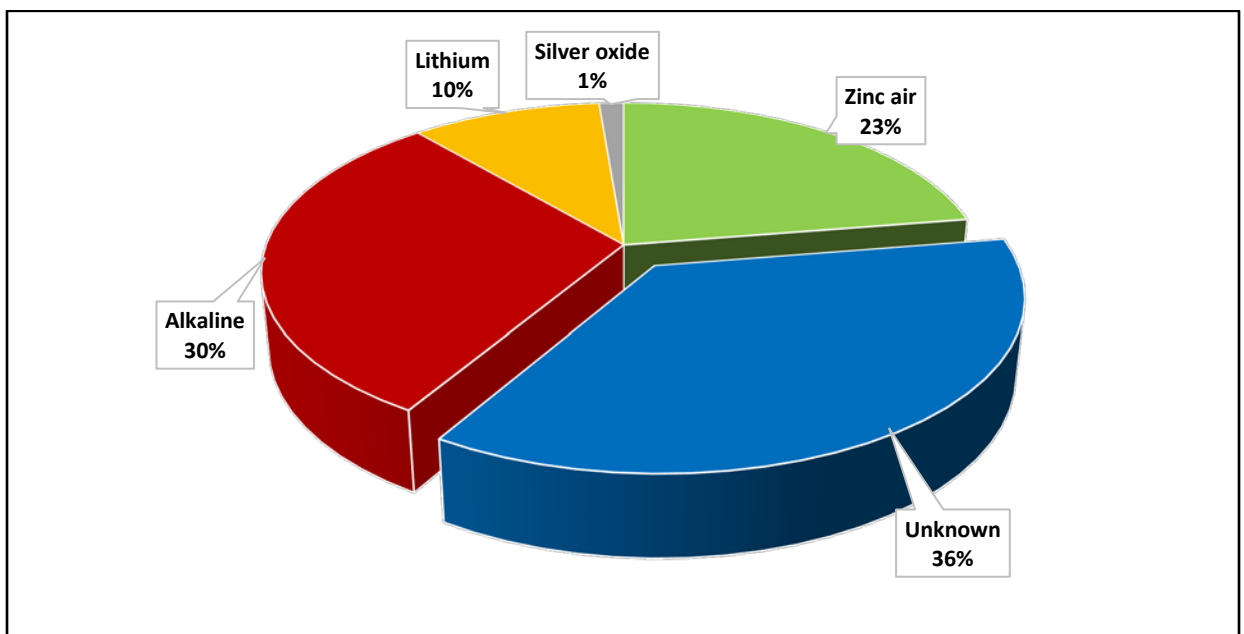


Table 5. Geographical Distribution of Caller by State, Country as Reported to the National Battery Ingestion Hotline, July 2022 to June 2023

United States	Number of Cases	United States	Number of Cases
Alabama	25	New Mexico	16
Alaska	6	New York	145
Arizona	70	North Carolina	88
Arkansas	26	North Dakota	8
California	264	Ohio	106
Colorado	48	Oklahoma	31
Connecticut	31	Oregon	43
D.C.	6	Pennsylvania	89
Delaware	7	Puerto Rico	1
Florida	173	Rhode Island	7
Georgia	90	South Carolina	31
Hawaii	19	South Dakota	10
Idaho	11	Tennessee	47
Illinois	105	Texas	251
Indiana	75	Unknown State	
Iowa	25	Utah	35
Kansas	20	Vermont	7
Kentucky	43	Virginia	83
Louisiana	31	Washington	49
Maine	18	West Virginia	22
Maryland	56	Wisconsin	44
Massachusetts	43	Wyoming	10
Michigan	90	Country	Number of Cases
Minnesota	41	Bahamas	1
Mississippi	33	Canada	65
Missouri	59	France	1
Montana	10	Iraq	1
Nebraska	16	Israel	1
Nevada	26	Japan	1
New Hampshire	6	Poland	1
New Jersey	71	South Africa	1

Figure 5. Caller Site Location, Reported to the National Battery Ingestion Hotline, July 2022 to June 2023

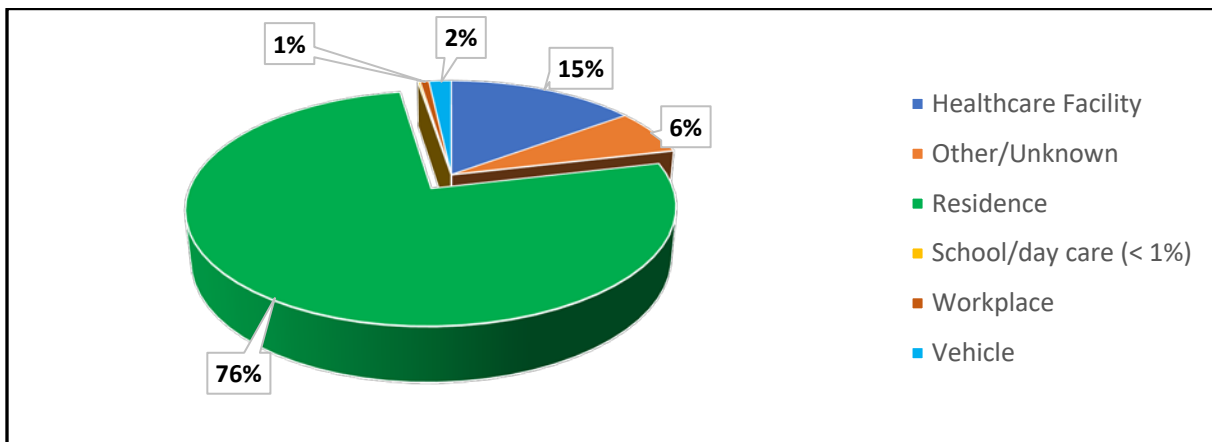


Figure 6. Medical Outcomes for Disc Battery Ingestion Cases Reported to the National Battery Ingestion Hotline, July 2022 to June 2023.

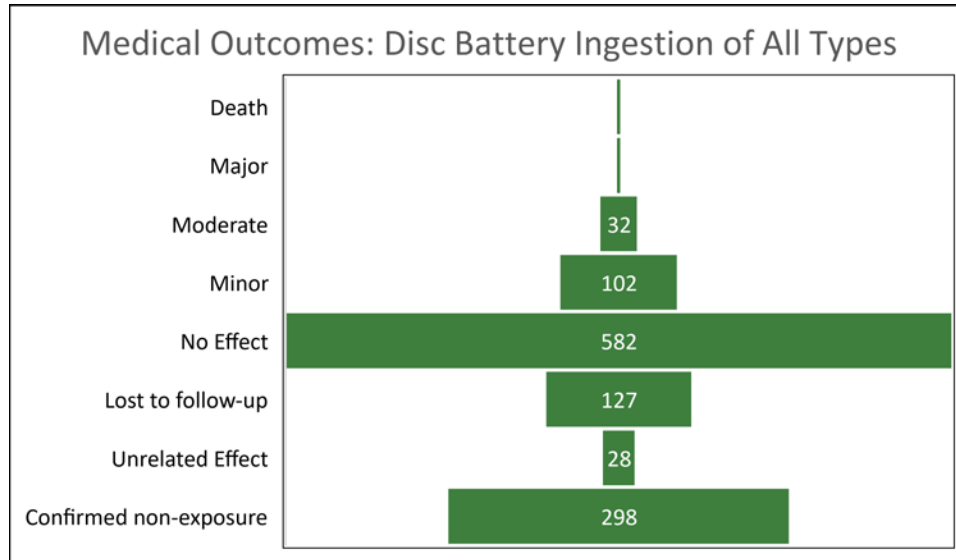


Figure 7. Medical Outcomes by Battery Type for Disc Battery Ingestion Cases Reported to the National Battery Ingestion Hotline, July 2022 to June 2023.

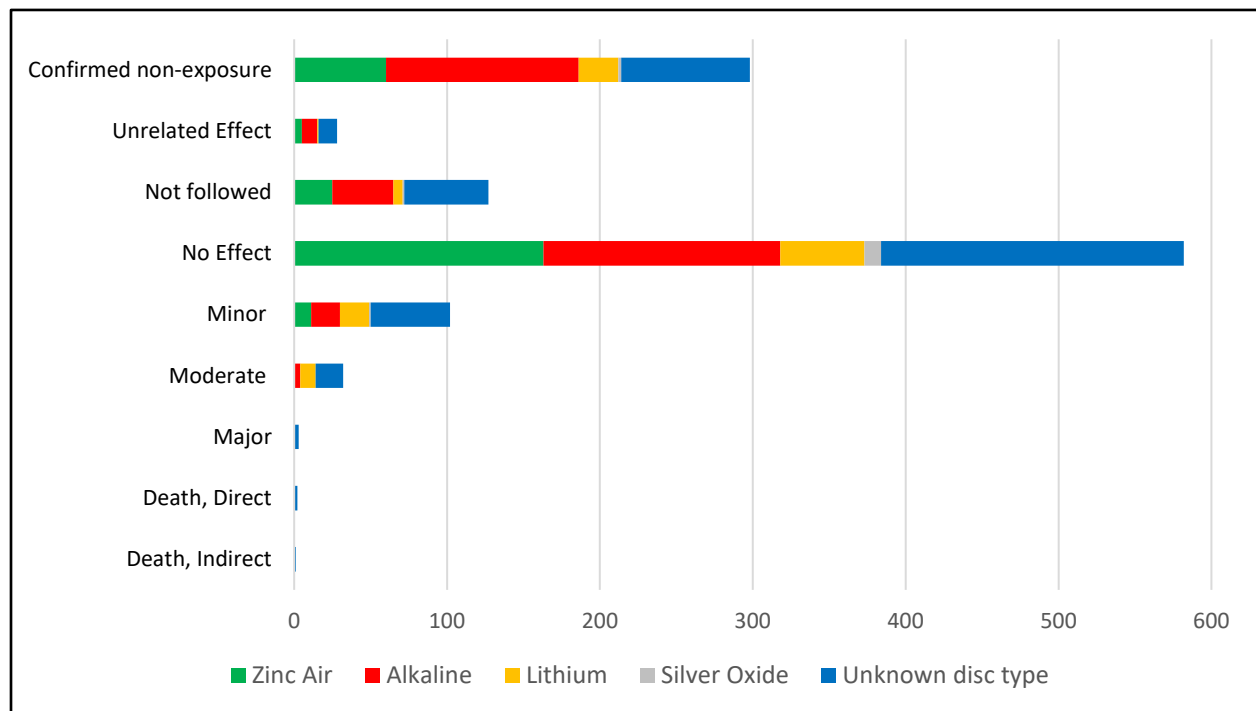


Figure 8: Medical Outcomes by Battery Type for Disc Battery Ingestion Cases Reported to the National Battery Ingestion Hotline, July 2022 to June 2023.

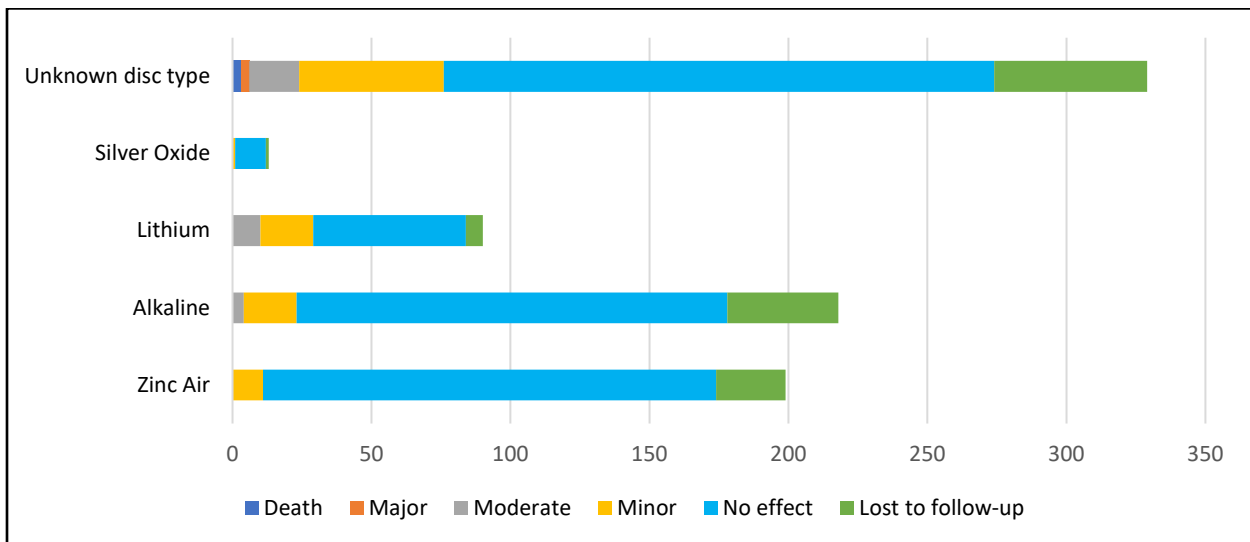


Figure 9: **Cumulative** Human Exposures to Disc Batteries by Type, Reported to the National Battery Ingestion Hotline, July 2018 to June 2023.

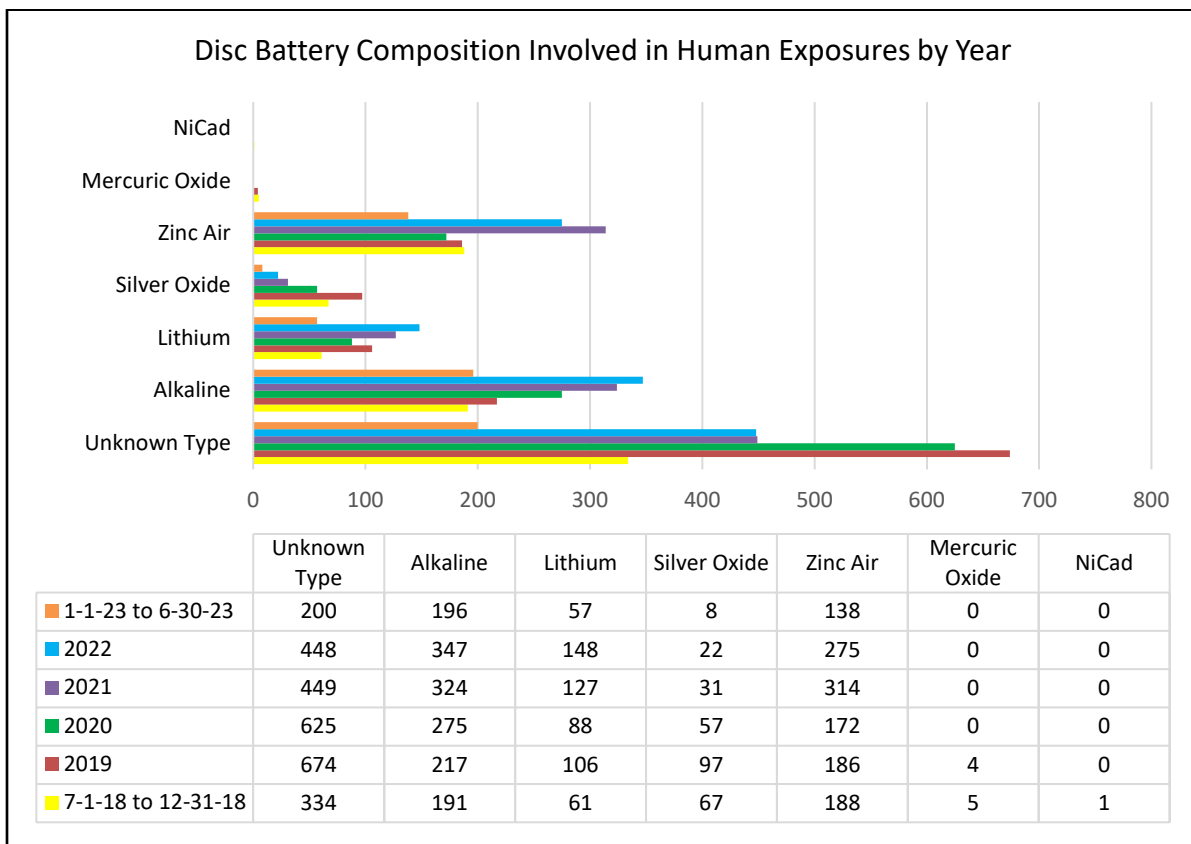


Figure 10: **Cumulative** Medical Outcomes by Disc Battery Type Reported to the National Battery Ingestion Hotline, July 2018 to June 2023.

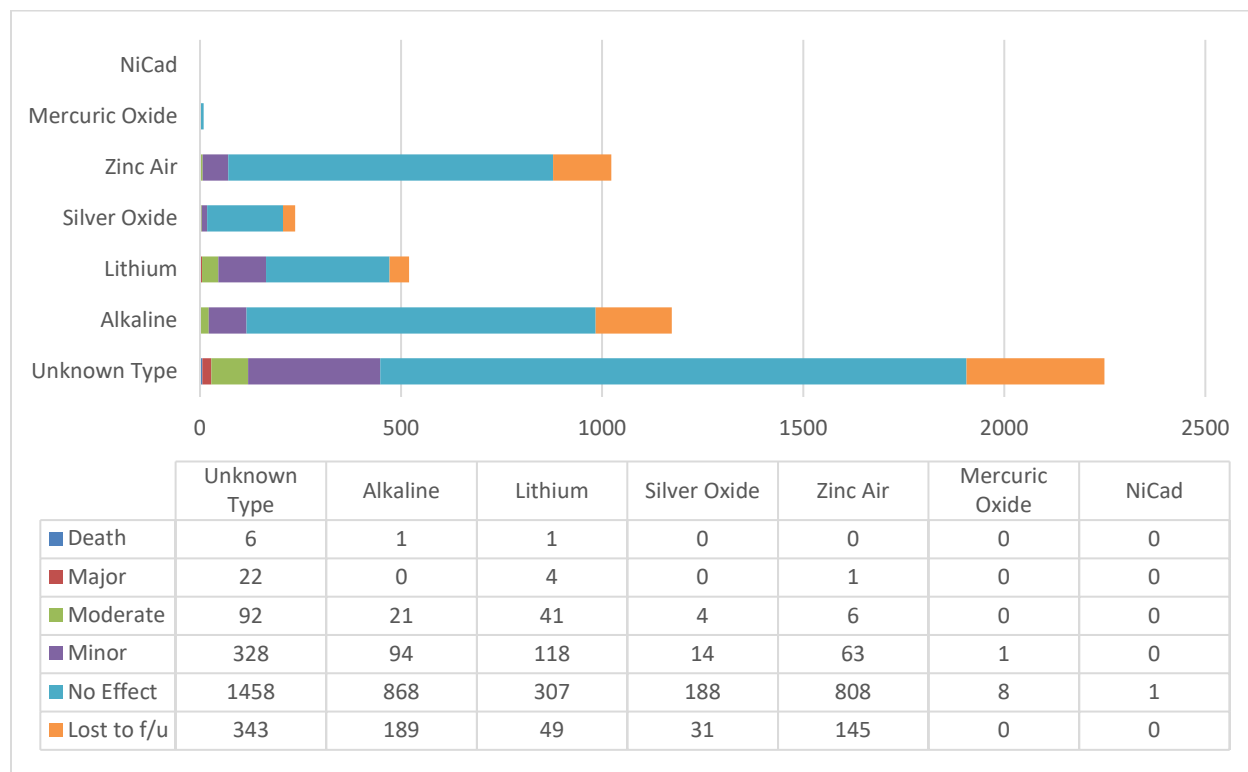


Table 6. Battery Ingestion Fatalities and Major Outcomes reported to the National Battery Ingestion Hotline, July 2022 to June 2023.

Outcome	Age of patient	Type of Battery	Details
Fatality	Child under 6 years	Unknown type of disc battery	Battery detected in child’s stomach after presenting to the hospital with vomiting. Prior to removal, the child experienced hematemesis and died despite aggressive resuscitation. It is unknown how long the battery was in her body as the ingestion was unwitnessed. Source of battery: unknown.
Fatality	Child under 6 years	Unknown type of disc battery	Witnessed disc battery ingestion in child occurred and caregiver immediately sought medical attention. Reportedly 2 hours after incident, child developed bleeding and was taken to surgery for battery removal. A single disc battery and a penny were removed from the stomach. Size was reported to be 20 mm but chemical composition of battery not known. Despite aggressive resuscitation, bleeding persisted, and the child died, approximately 24 hours later. Source of battery: unknown.
Fatality, indirect report	Child under 6 years old	Unknown type of disc battery	Caller reported being aware of a child who passed away after ingesting a disc battery and wanting more information (resources) regarding childhood battery ingestion. No details surrounding fatality were provided. Source of battery: unknown.

Major	Child under 6 years old	Unknown type of disc battery	Child swallowed disc battery and was removed from esophagus. Time from removal to ingestion unknown. Diagnosed with airway edema and esophageal stricture and was hospitalized for 17 days in the pediatrics intensive care unit before being medically cleared to go home. Source of battery: unknown.
Major	Child under 6 years old	Unknown type of disc battery	Witnessed disc battery ingestion in child occurred and caregiver immediately sought medical attention. Battery noted to be in esophagus and was removed approximately 3 hours after ingestion. Damage and inflammation were visualized in the esophagus and required a feeding tube over 15-day hospitalization. She was discharged on a liquid diet. Source of battery: lamp remote control.
Major	Child under 6 years old	Unknown type of disc battery	Child with unwitnessed ingestion of a 23 mm disc battery and a penny. Both objects located in the esophagus and immediately removed. Significant esophageal stricture and injury were visualized and child was discharged 4 days later. Source of battery: unknown.

Figure 11. Battery Source by Device, when known, for cases reported to the National Battery Ingestion Line, July 2022 to June 2023.

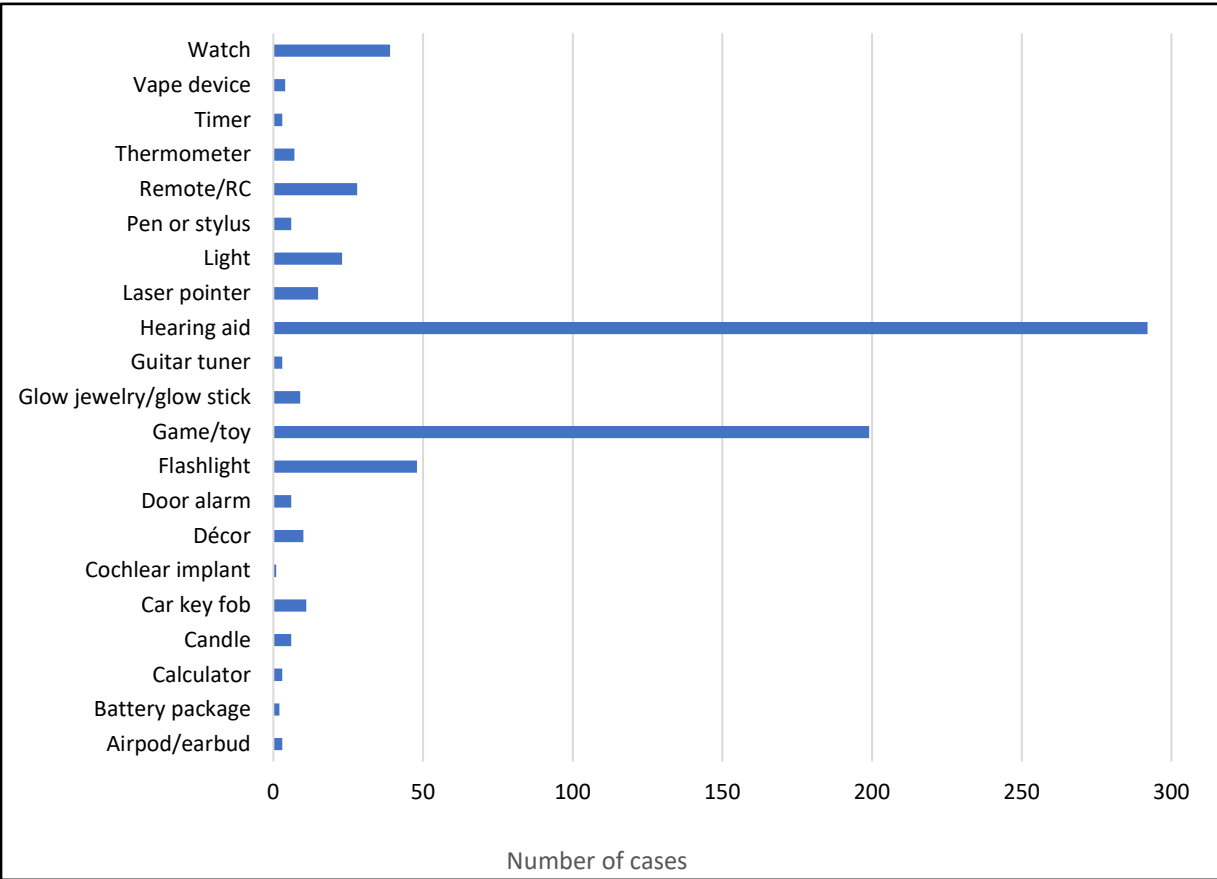


Figure 12. Disc Battery Size, when known, for cases reported to the National Battery Ingestion Line, July 2022 to June 2023.

