ROCKY MOUNTAIN
POISON & DRUG SAFETY
POISON CENTER & HEALTH INFORMATION

National Battery Ingestion Hotline

1-800-498-8666

July 1, 2023 to June 30, 2024 Annual Report

Rocky Mountain Poison Center

777 Bannock Street, Mail Code 0180

Denver, Colorado 80204

Prepared by:

Shireen Banerji, PharmD (Shireen.Banerji@rmpds.org)

Christopher Hoyte, MD (Christopher.Hoyte@ucdenver.edu)

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For administrative questions, call 303-389-1392

EXECUTIVE SUMMARY

This report summarizes 1,945 human battery exposures reported to the Rocky Mountain Poison Center's National Battery Ingestion Hotline (NBIH) during the 12-month period from July 1, 2023, through June 30, 2024. Of this total, 1,031 of these cases specifically involved ingestion or suspicion of ingestion of one or more **disc** batteries. This is down by 12.3% 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 639 "confirmed non-ingestion" cases were removed from total case counts, there were a total of 2,572 human ingestion exposures involving disc batteries: 1,539 (60%) 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=541) followed by 2-year-old children (n=342). In the age range of 6-12 years there were also 342 cases. For teenagers (13-19 years) there were 96 cases. For cases involving 20 to 59-year-old adults, there were 212 cases, and there were 319 (12% of all disc battery ingestion exposures) cases involving adults 60 years and older. Comparing these findings to the previous year (when "confirmed non-ingestion" cases are removed), disc battery ingestion nationally was ***down*** overall by 7.6% (2,784 exposures in previous contract year when 749 "confirmed non-ingestion" cases were removed) which is a positive finding.

Regarding exposures to disc battery ingestion reported to NPDS nationally (Table 2), medical outcomes included 1,210 cases with no effects, 195 with minor effects, 58 with moderate effects, and 13 with major effects. There were 2 deaths reported (1 reported directly to the NBIH, and 1 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 1,539 disc battery ingestion exposures (excluding 559 "confirmed non-ingestion" cases) reported to NPDS during this same time period (Table 3). This age group represents 60% of total disc battery ingestions reported nationally. Medical outcomes included 708 with no effects, 98 with minor effects, 28 with moderate effects, and 6 with major effects. The 2 deaths reported in overall disc battery ingestion were both from this age group (0-5 years); 1 was directly reported to the NBIH and 1 was an indirect report in which there was no poison center involvement with the care of the patient. 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 (50%) from the previous contract year. Therapeutic errors represented 2.3% (n=24) of all disc battery confirmed or suspected ingestions, all occurring in the adult age range with 79% specifically in the 60 years old and above group. Of all disc battery confirmed or suspected ingestions, the disc battery type was unknown in 37% of cases (Figure 4). 29% of cases involved alkaline disc batteries while another 24% of cases involved zinc-air batteries and 8% involving lithium coin cell batteries. Only 2% 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), Florida (196), and Texas (192). This is not surprising as these three states are in the top 5 most populated states according to US Census numbers. There were also 57 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 1,031 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=548) followed by minor (n=94), moderate effect (n=16), 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, 107 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 6 (June 30, 2024). There was 1 fatality directly reported to the National Battery Ingestion Hotline by health care providers. See Table 6 for details of the fatality 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 233 cases where it was later confirmed that there was no exposure after all (battery was eventually located) and there were 29 cases where the caller reported signs and symptoms judged *unrelated* to battery exposure by the Specialist in Poison Information.

A total of 1,945 human exposures to batteries of any type were reported to NBIH during the fifth contract year. Disc batteries were the most common battery type involved in human

exposures (n=1055). 1,031 exposures involved actual disc battery exposure by mouth, 234 were later determined to be confirmed non-exposures, 8 cases involved dermal exposure, 10 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 43% (n=835), which is 12% less than the previous contract year. 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 (270) were the most common devices associated with human battery exposures. Of note, 328 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 (154). The most common size of disc batteries associated with human exposures when known, were batteries under 10 mm (330), 10-14 mm (281) and ≥ 20 mm (89), and 15-19 mm (10). Unfortunately, for 321 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 continues to decrease, 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

Figure 1. National Battery Ingestion Hotline Case Volume Characterization, July 2023 to June 2024

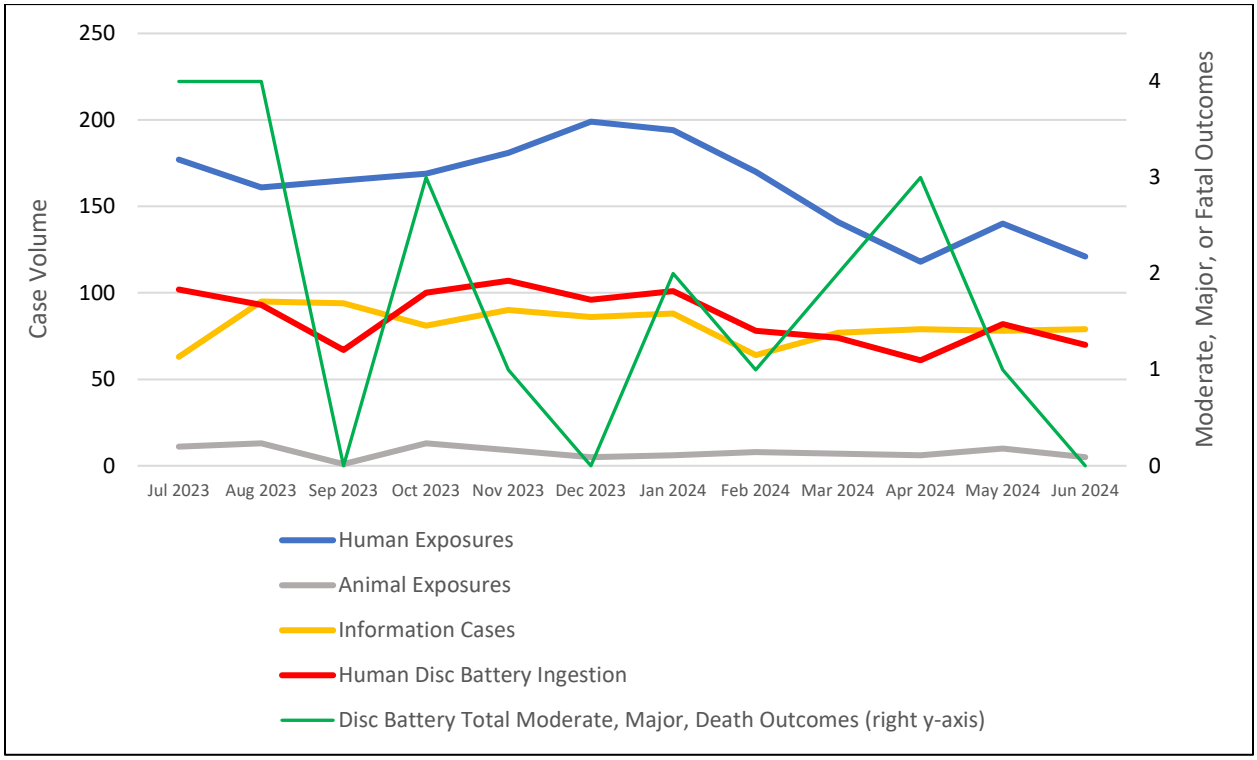


Table 1. National Battery Ingestion Hotline Human Exposures by Age Range, Gender, and Disc Battery Ingestion, July 2023 to June 2024

Age	Female	Male	Unknown gender	All routes, all types of batteries	Disc Battery Ingestion Cases
<1 year	40	59	2	101	44
1 year	**144**	**217**	**1**	**362**	**202**
2 years	121	168	3	292	137
3 years	73	125	1	199	96
4 years	37	80	2	119	58
5 years	14	37	0	51	28
Unknown age but ≤ 5years	0	0	1	1	0
6 to 12 years	62	155	1	218	127
13 to 19 years	61	32	0	93	36
Unknown Child (≤ 19 years)	0	8	2	10	6
20-29 years	41	34	2	77	24
30-39 years	34	31	0	65	22
40-49 years	21	15	0	36	16
50-59 years	14	12	0	26	14
60-69 years	41	23	0	64	52
70-79 years	42	40	0	82	71
80-89 years	35	27	0	62	59
>= 90 years	19	12	0	31	28
Unknown Adult (≥20 years)	9	19	1	29	7
Unknown Age	4	2	8	14	4
Total:	**812**	**1,096**	**24**	**1,932**	**1,031**

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

Table 2. National Poison Data System, Human Disc Battery Ingestion Exposures and Outcomes, July 2023 to June 2024, 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
2,572 (excludes 639 'confirmed non-exposures')	1,539	342	96	212	319	82	1,210	195	58	13	2*

HCF = healthcare facility

*1 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: America's Poison Centers, National Poison Data System, www.npds.us [accessed on 9/26/2024].

Table 3. National Poison Data System, Human Disc Battery Ingestion Exposures and Outcomes, July 2023 to June 2024, Age 0 to 5 years

Number of Ingestions	% Treated or referred to HCF	No Effect	Minor	Moderate	Major	Death
1,539 (excludes 559 'confirmed non-exposures')	84	708	98	28	6	2*

HCF = healthcare facility

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

Data used by permission: America's Poison Centers, National Poison Data System. www.npds.us [accessed on 9/26/2024].

Figure 2. 6-Year Trend of National Battery Ingestion Hotline, July 2018 to June 2024

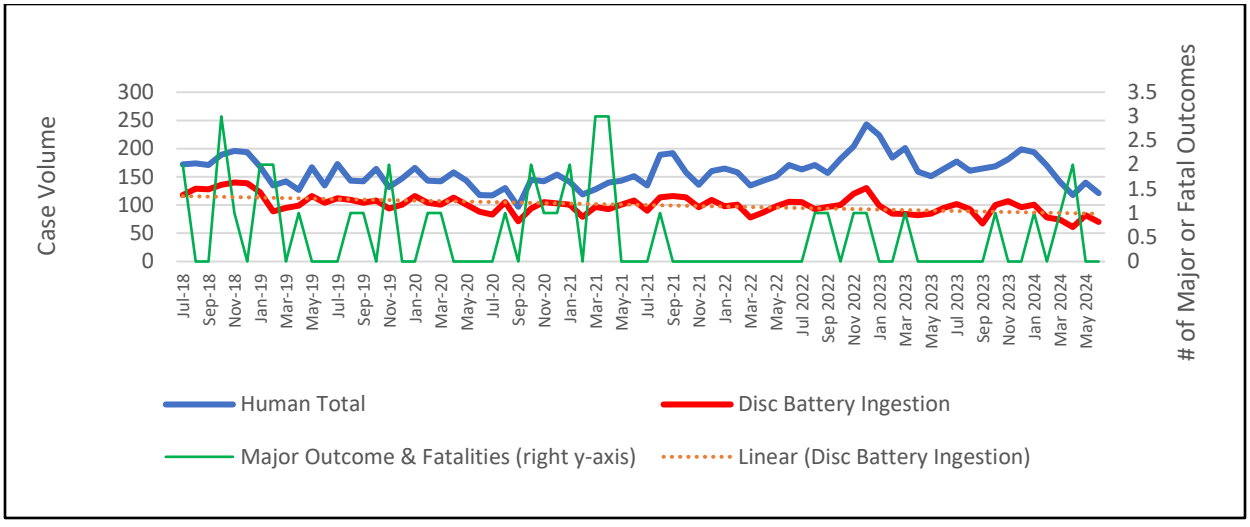


Table 4. Battery Hotline Human Disc Battery Ingestions by Gender, July 2023 to June 2024

Gender	Number of Exposures
Male	550
Female	472
Unknown	9

Figure 3. Human Battery Exposure by Age Range and Type Reported to the National Battery Ingestion Hotline, July 2023 to June 2024

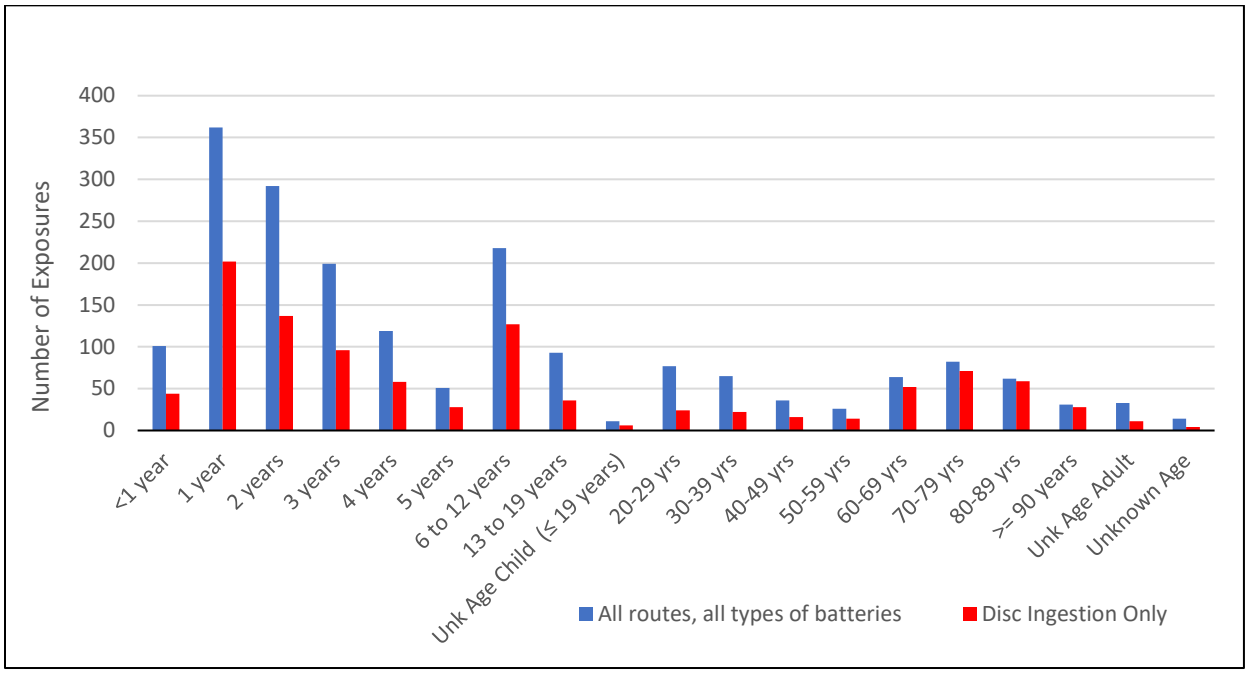


Figure 4. Disc Battery Ingestion by Types Reported to the National Battery Ingestion Hotline, July 2023 to June 2024

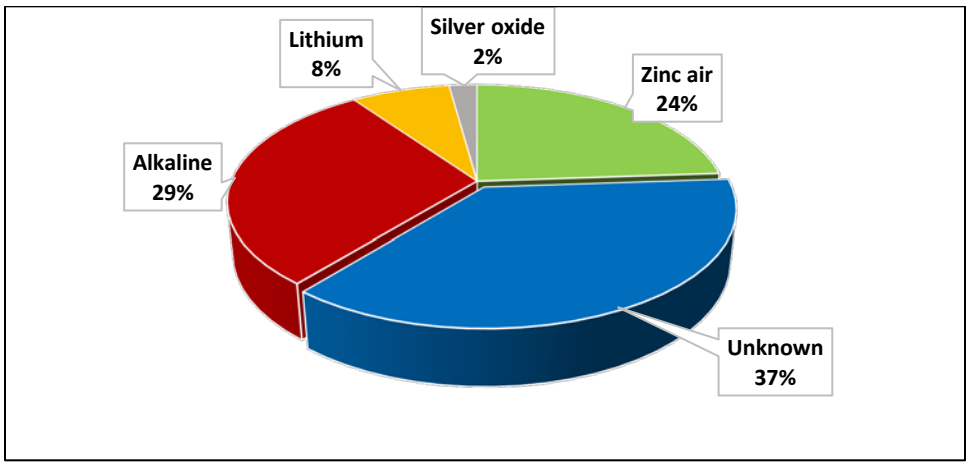


Table 5. Geographical Distribution of Caller by State, Country as Reported to the National Battery Ingestion Hotline, July 2023 to June 2024

State	Number of Cases	State	Number of Cases
Alabama	38	New Hampshire	7
Alaska	5	New Jersey	57
Arizona	83	New Mexico	8
Arkansas	28	**New York**	**139**
California	**264**	North Carolina	89
Colorado	49	North Dakota	6
Connecticut	26	Ohio	70
Washington, D.C.	11	Oklahoma	23
Delaware	7	Oregon	35
Florida	**196**	**Pennsylvania**	**109**
Georgia	108	Puerto Rico	0
Hawaii	8	Rhode Island	9
Idaho	8	South Carolina	42
Illinois	107	South Dakota	5
Indiana	57	Tennessee	47
Iowa	12	**Texas**	**192**
Kansas	20	Unknown State	426
Kentucky	48	Utah	46
Louisiana	33	Vermont	6
Maine	13	Virginia	72
Maryland	45	Washington	58
Massachusetts	41	West Virginia	15
Michigan	85	Wisconsin	40
Minnesota	24	Wyoming	5
Mississippi	7	**Country**	**Number of Cases**
Missouri	43	Canada	57
Montana	17	China	2
Nebraska	15	England	1
Nevada	40		

Figure 5. Caller Site Location, Reported to the National Battery Ingestion Hotline, July 2023 to June 2024

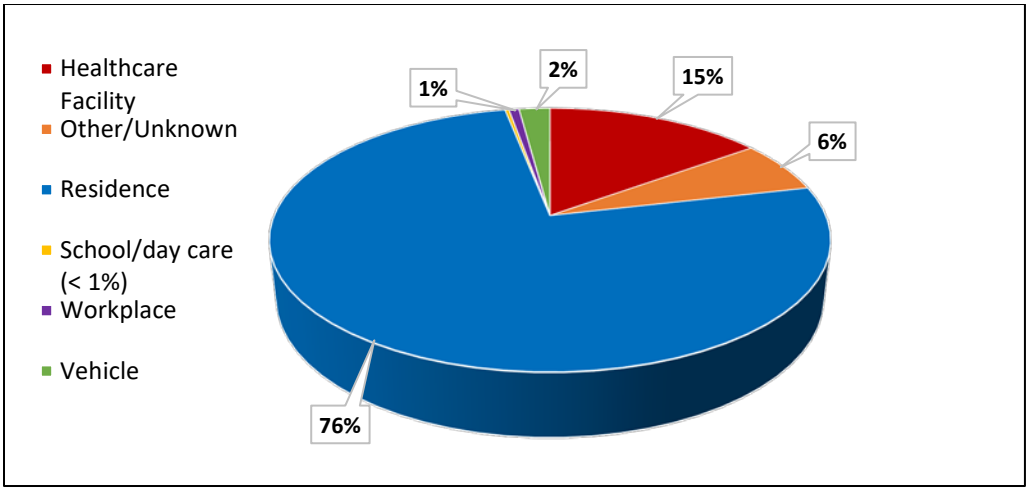


Figure 6. Medical Outcomes for Disc Battery Ingestion Cases Reported to the National Battery Ingestion Hotline, July 2023 to June 2024.

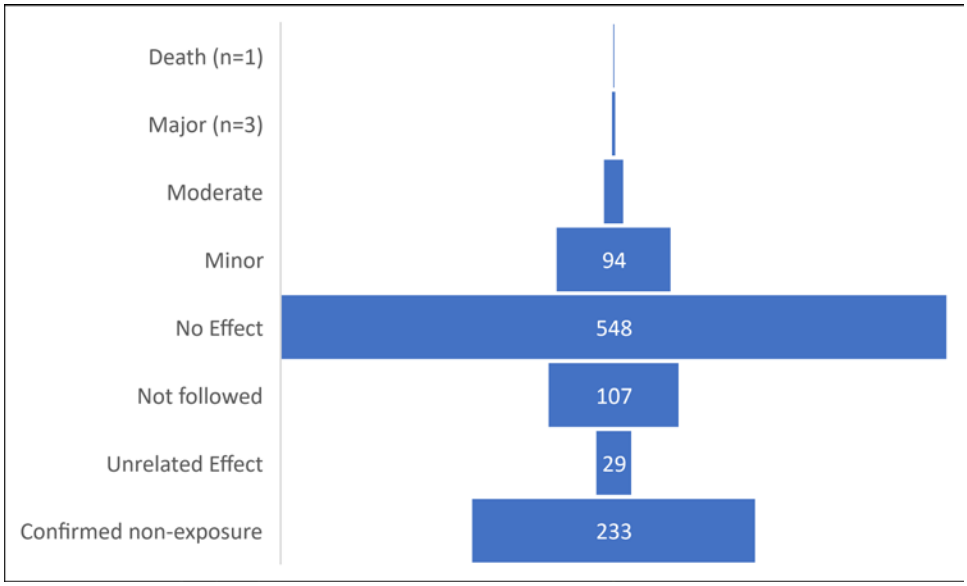


Figure 7. Medical Outcomes by Battery Type for Disc Battery Ingestion Cases Reported to the National Battery Ingestion Hotline, July 2023 to June 2024.

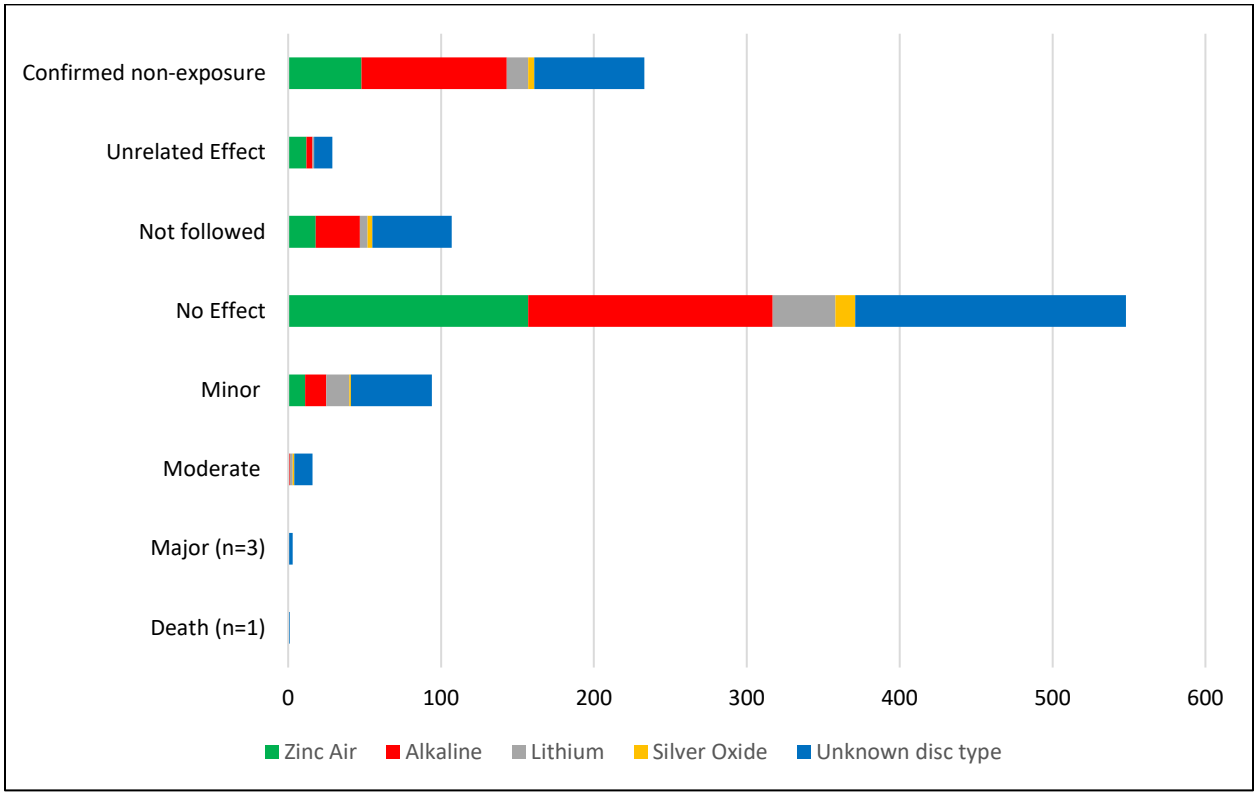


Figure 8: Medical Outcomes by Battery Type for Disc Battery Ingestion Cases Reported to the National Battery Ingestion Hotline, July 2023 to June 2024.

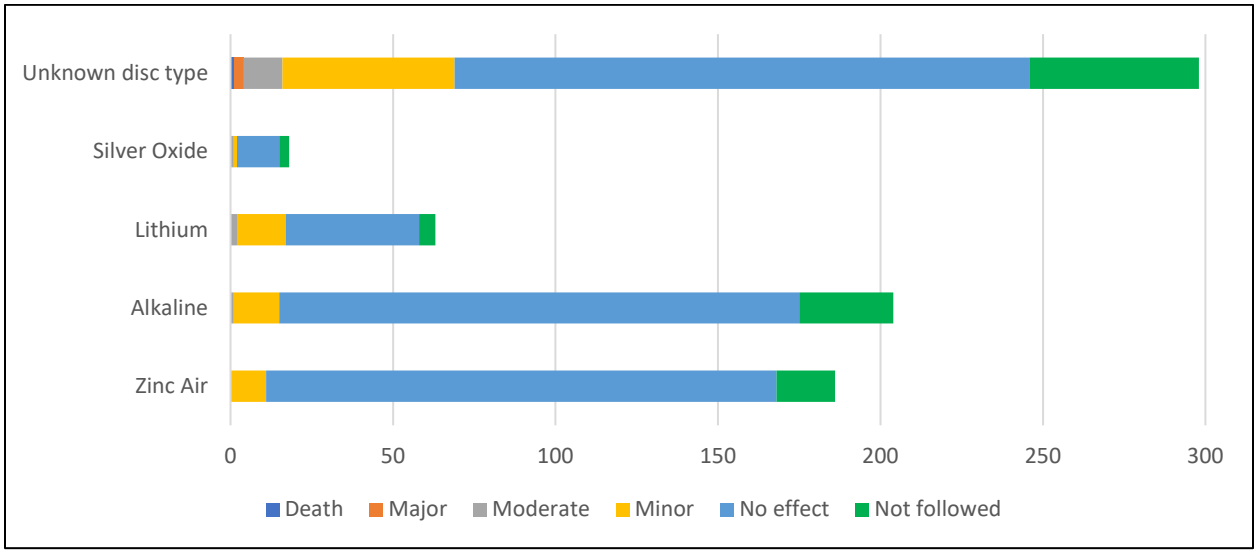
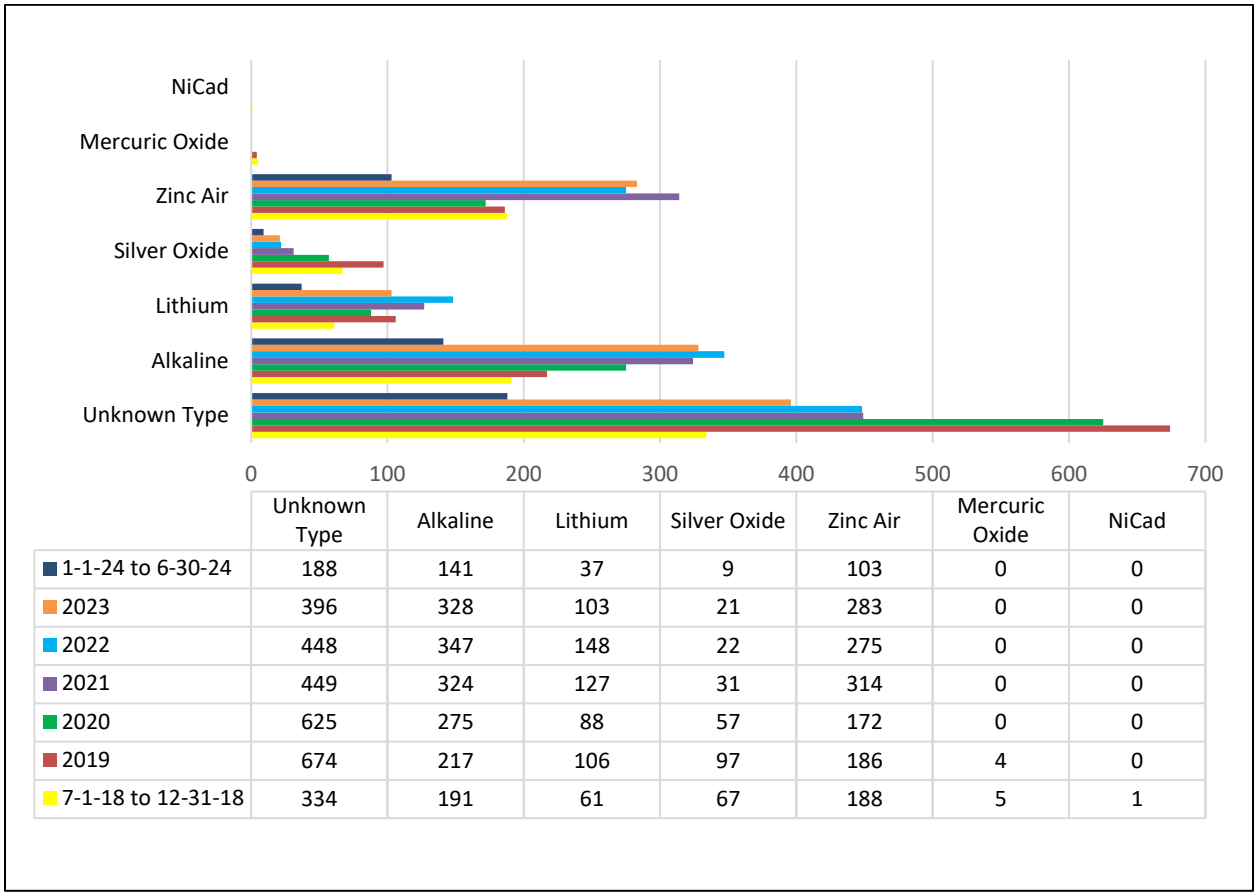
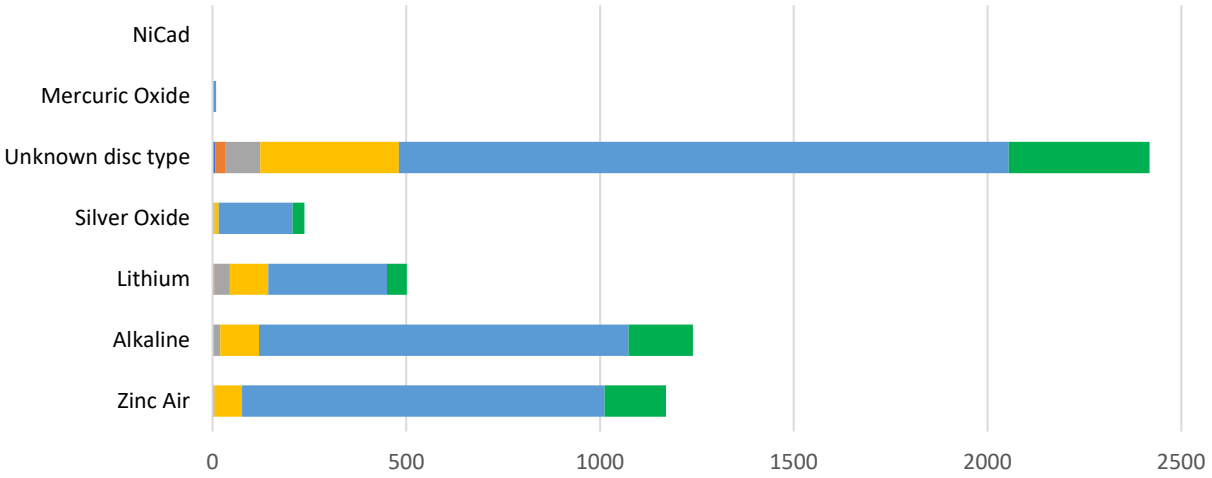


Figure 9: **Cumulative** Human Exposures to Disc Batteries by Year and Type, Reported to the National Battery Ingestion Hotline, July 2018 to June 2024.



	Unknown Type	Alkaline	Lithium	Silver Oxide	Zinc Air	Mercuric Oxide	NiCad
1-1-24 to 6-30-24	188	141	37	9	103	0	0
2023	396	328	103	21	283	0	0
2022	448	347	148	22	275	0	0
2021	449	324	127	31	314	0	0
2020	625	275	88	57	172	0	0
2019	674	217	106	97	186	4	0
7-1-18 to 12-31-18	334	191	61	67	188	5	1

Figure 10: **Cumulative** Medical Outcomes by Disc Battery Type Reported to the National Battery Ingestion Hotline, July 2018 to June 2024.



	Zinc Air	Alkaline	Lithium	Silver Oxide	Unknown disc type	Mercuric Oxide	NiCad
Death	0	1	1	0	7	0	0
Major	1	0	4	0	25	0	0
Moderate	4	19	40	5	91	0	0
Minor	71	100	99	11	358	1	0
No Effect	936	954	306	191	1574	8	1
Lost to f/u	158	166	51	30	363	0	0

Table 6. Battery Ingestion Fatalities and Major Outcomes reported to the National Battery Ingestion Hotline, July 2023 to June 2024.

Outcome	Age of patient	Type of Battery	Details
Fatality	Child under 6 years	Unknown type of disc battery	Disc battery detected on x-ray in esophagus after child presented to the ER coughing and vomiting up blood. Resuscitative efforts were performed but unsuccessful. Autopsy showed ulceration, necrosis, and perforation of tracheoesophageal septum. Non-witnessed ingestion; Source of battery and battery type: unknown.
Major	Child under 6 years	Unknown type of disc battery	Disc battery detected on x-ray in esophagus after child presented to the ER with 3-day history of abdominal pain and vomiting. Battery was removed and child was hospitalized in the intensive care due to ulceration and scarring of her esophagus. She required tube feedings and was discharged after 15 days of hospitalization. Non-witnessed ingestion; Source of battery and battery type: unknown.

Major	Child under 6 years old	Unknown type of disc battery	26 mm disc battery detected on x-ray in esophagus after child presented to the ER with 2-day history of respiratory abnormalities. Battery was removed and significant erosive damage to the esophagus occurred. Required intubation for 6 days due to swelling of airway. Further testing revealed transesophageal fistula and child required tube feedings. Hospitalization was over 18 days. Non-witnessed ingestion; Source of battery and battery type: unknown.
Major	Child between 6 and 12 years	Unknown type of disc battery	Child ingested battery for unknown reasons and was brought to hospital within an hour from ingestion. It was noted to be lodged in esophagus and was removed. Despite prompt removal, there were multiple sites of injury to esophagus. Required 6 days of hospitalization and feedings by tube. Source of battery and battery type: unknown

Figure 11. Battery Source by Device, when known, for cases reported to the National Battery Ingestion Line, July 2023 to June 2024.

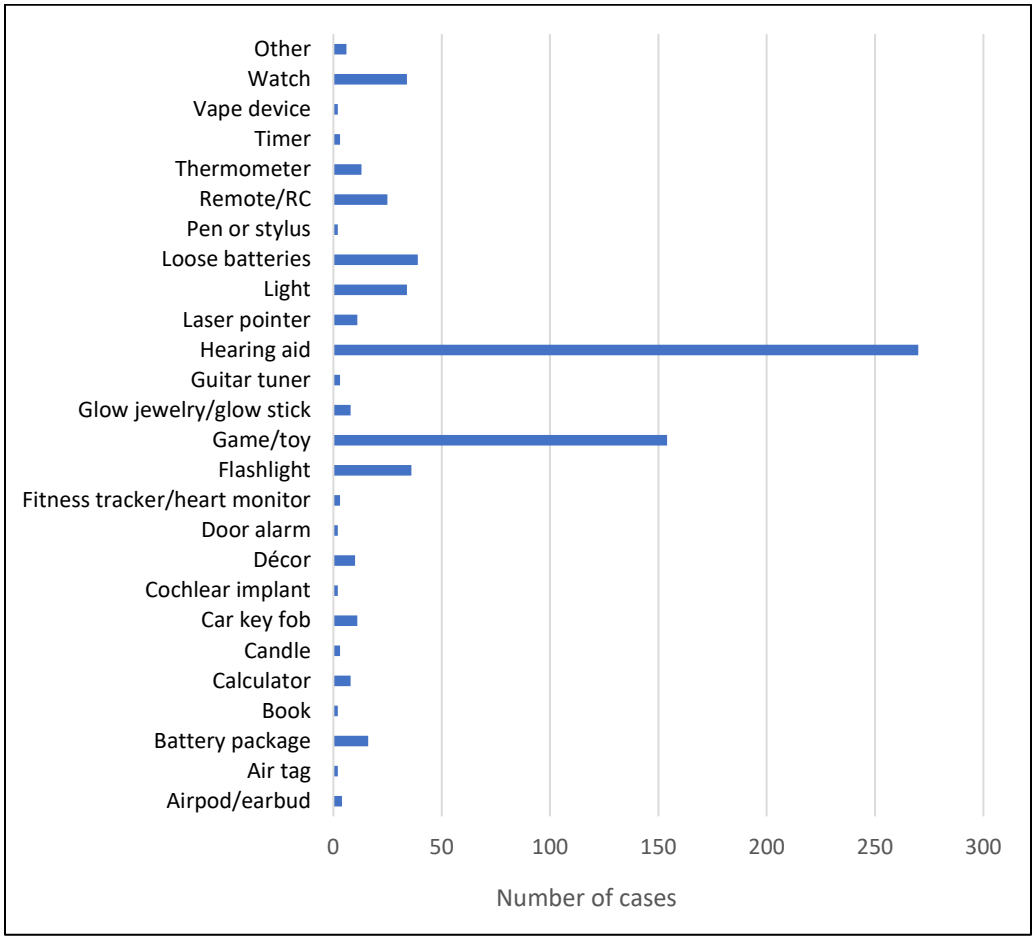


Figure 12. Disc Battery Size, when known, for cases reported to the National Battery Ingestion Line, July 2023 to June 2024.