

National Battery Ingestion Hotline

1-800-498-8666

July 1, 2020 to June 30, 2021 Annual Report

Rocky Mountain Poison Center

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EXECUTIVE SUMMARY

This report summarizes 1,607 human battery exposures reported to the Rocky Mountain Poison Center's National Battery Ingestion Hotline (NBIH) during the 12-month period from July 1, 2020 through June 30, 2021. Of these, 1,587 cases involved ingestion of a battery, and furthermore, 1,145 of these cases specifically involved ingestion of one or more **disc** batteries. 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, there was a total of 3,507 human ingestion of disc batteries: 2,388 (68%) specifically involving children 0-6 years of age. The most common age in this range was 1-year old (n=819) followed by 2-year-old children (n=511). In the age range of 6-12 years there were 421 cases. For teenagers (13-19 years) there were 99 cases. For cases involving 20 to 59-year-old adults, there were 169 cases, and there were 473 (13%) cases involving adults greater than 60 years.

Regarding exposures to disc battery ingestion reported to NPDS nationally, medical outcomes included 1,469 no effects, 232 minor effects, 96 moderate effects, and 32 major effects. There were 9 deaths reported (4 reported directly to a poison center, and 5 by indirect reports in which there was no poison center involvement). Of note, 89% of cases were either referred to or originated from healthcare facilities (HCF).

In children age 0-6 years, there were 2,388 disc battery ingestion exposures reported to NPDS during this same time period (Table 3). Medical outcomes included 948 no effects, 125 minor effects, 59 moderate effects, 24 major effects. The 9 deaths mentioned above were in this age group. Similar to the overall NPDS data, 87% of cases were either referred to or originated from healthcare facilities.

Figure 2 shows a slight downward trend over the past 2-year time period in total human exposures to disc batteries as well as major outcomes and fatalities. We suspect this difference continues to represent the general downward volume of calls to poison control centers and an increased promotion of the National Battery Ingestion Hotline and overall heightened public awareness of the ingestion hazard. Like the prior year, Table 4 shows that the majority (54%) of exposures in the third 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 again for patients who are 60 years and over, with a peak 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. In fact, these types of “therapeutic errors” increased by 27% from the previous contract year. Therapeutic errors represented 14% (n=162) of all disc battery ingestions, all occurring in the adult age range with 93% specifically in the 60 years old and above group. Of all disc battery exposures, the disc battery type was unknown in 41% of cases (Figure 4). 25% of cases involved alkaline disc batteries while another 22% of cases involved zinc-air batteries and 10% involving lithium coin cell batteries. Table 5 demonstrates the geographical location of the caller when known. The top 3 states with the highest number of callers were California (205), Texas (159), and Florida (145). This is not surprising as these three states are in the top 5 most populated states according to US Census numbers. There were also 61 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 of was the caller’s own residence (72%) followed by healthcare facilities (17%) (Figure 5).

The most common medical outcome (Figure 6) reported that was associated with battery exposures [all routes, ingestion only of any type] was no effect [915, 874] followed by minor [228, 191], moderate effect [35, 32], and major effect [14, 12]. Of these cases, [148, 140] were lost to follow up. There were 3 fatalities reported to the NBIH (Table 6). There were [289, 289] cases where it was later confirmed that there was no exposure after all (battery was located) and there were [42, 38] cases where the caller reported signs and symptoms unrelated to battery exposure. Medical outcomes reported specifically involving disc battery ingestion were as follows: no effect (610) followed by minor (114), moderate effect (29), and major effect (11). Of these cases, 121 were lost to follow up and there were 3 fatalities as mentioned above (Table 6). There were 225 cases where it was confirmed that there was no exposure and there were 27 cases where the caller reported signs and symptoms unrelated to battery exposure. The other age ranges shown in the figures appear to follow the same proportions. The age group with the highest number of major outcomes was the 0-5 years range (n=11, 100% of the major outcomes). Disc batteries were the most common battery type involved in human exposures. There were 1,145 cases where disc battery ingestion was confirmed or suspected. The percentage of cylindrical alkaline battery exposure cases from total human battery exposure cases reported to the NBIH was 25% (n=401). When the source of the battery was known, hearing aids (319) were the most common devices associated with human battery exposures. Of note, 386 cases of battery exposure were associated with cases where the devices were unknown (Figure 7). Disc battery access from games and toys were frequently involved in cases of disc battery ingestion (156). The most common size of disc batteries associated with human exposures when known, was less than 10 mm (321) followed by batteries within the 10-14 mm range (261), ≥ 20 mm (118), and 15-19 mm (6). Unfortunately, in a majority (435) of cases, the battery size was unknown or not able to be determined (Figure 8).

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). The National Battery Ingestion Hotline data demonstrate that patients greater than 60 years of age are also at risk of accidental disc battery ingestion since usage of hearing aid devices tends to parallel advancing age.

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.

Acknowledgements: Lynn Antony and Amber Lucero, for their clerical assistance in the preparation of this report.

Tables and Figures

Table 1. National Battery Ingestion Hotline Human Exposures by Age Range, Gender, and Disc Battery Ingestion, July 2020 to June 2021

Age	Female	Male	Unknown	All routes, all types of batteries	Disc battery ingestion only
<1	33	43	3	79	56
1	146	163	4	313	231
2	76	130	2	208	152
3	68	75	2	145	110
4	39	53	0	92	71
5	14	37	0	51	43
Unk <= 5years	0	1	0	1	1
6 to 12 years	55	120	0	175	133
13 to 19 years	42	29	0	71	28
Unknown Child	1	4	3	8	4
20's	21	21	1	43	14
30's	27	30	0	57	14
40's	13	11	0	24	15
50's	9	10	0	19	14
60's	26	19	0	45	35
70's	55	51	1	107	98
80's	33	35	0	68	65
>= 90 years	31	16	0	47	45
Unknown Adult	18	20	0	38	12
Unknown Age	4	7	5	16	4
Total:	711	875	21	1,607	1145

Figure 1. National Battery Ingestion Hotline Case Volume Characterization, July 2020 to June 2021

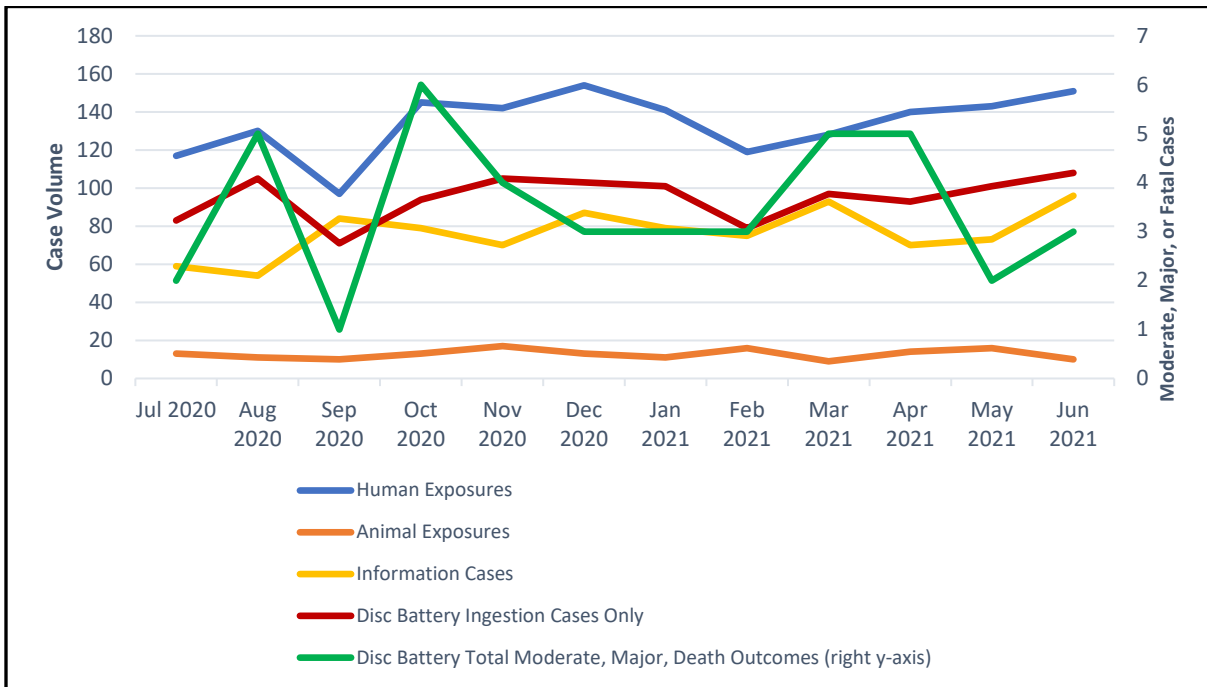


Table 2. National Poison Data System, Human Disc Battery Ingestion Exposures and Outcomes, July 2020 to June 2021, All Ages

Total Number of Ingestions	Age < 6 years	Age 6-12 years	Age 13-19 years	Age 20-59 years	Age > 60 years	% Treated in HCF	No Effect	Minor Effect	Moderate Effect	Major Effect	Death
3,507	2,388	421	99	169	473	89	1,469	232	96	32	9*

*5 of the deaths were by *indirect* report to regional poison centers, not direct poison center consultation, all were in the age 0-6 year age range (shown below).

Data used by permission: American Association of Poison Control Centers, National Poison Data System. www.aapcc.org. [accessed on 9/28/2021].

Table 3. National Poison Data System, Human Disc Battery Ingestion Exposures and Outcomes, July 2020 to June 2021, Age 0 to 6 years

Number of Ingestions	% Treated in HCF	No Effect	Minor	Moderate	Major	Death
2,388	87	948	125	59	24	9*

Data used by permission: American Association of Poison Control Centers, National Poison Data System. www.aapcc.org.
 *5 of the deaths were by *indirect* report to regional poison centers, not direct poison center consultation.
 [accessed on 9/28/2021].

Figure 2. 2-Year Trend of National Battery Ingestion Hotline, July 2019 to June 2021

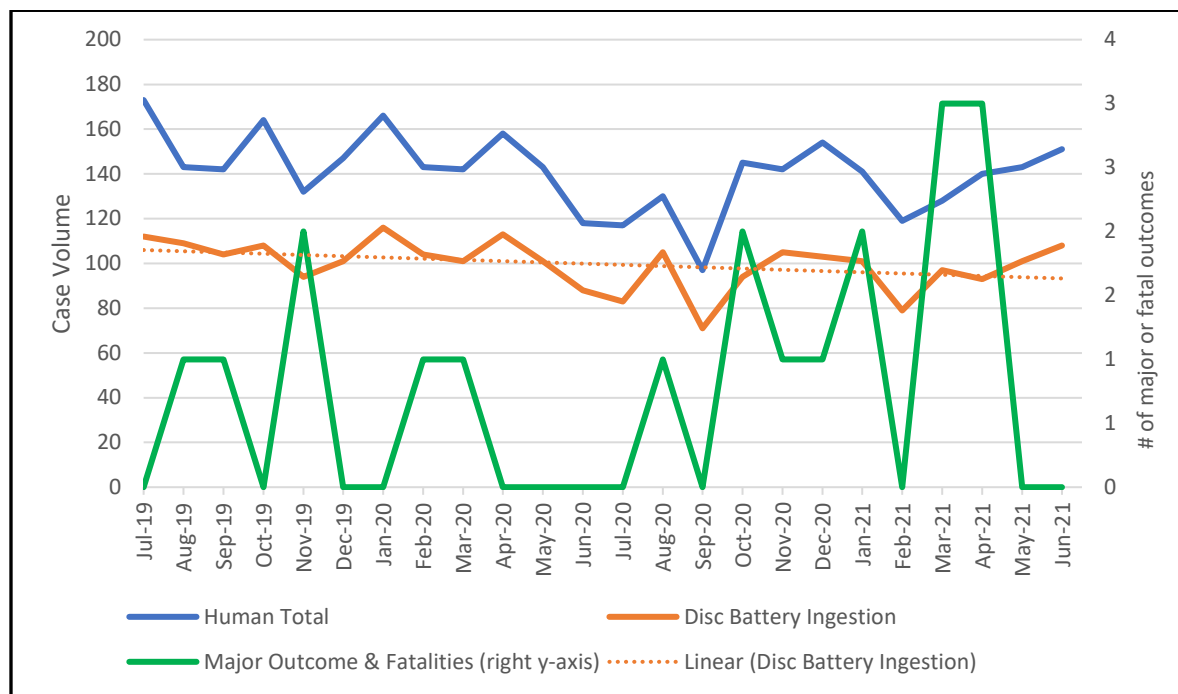


Table 4. National Battery Ingestion Hotline Exposures by Gender, July 2020 to June 2021

Gender	Number of Exposures
Male	875
Female	711
Unknown	21

Figure 3. Human Battery Exposure by Age Range and Type Reported to the National Battery Ingestion Hotline, July 2020 to June 2021

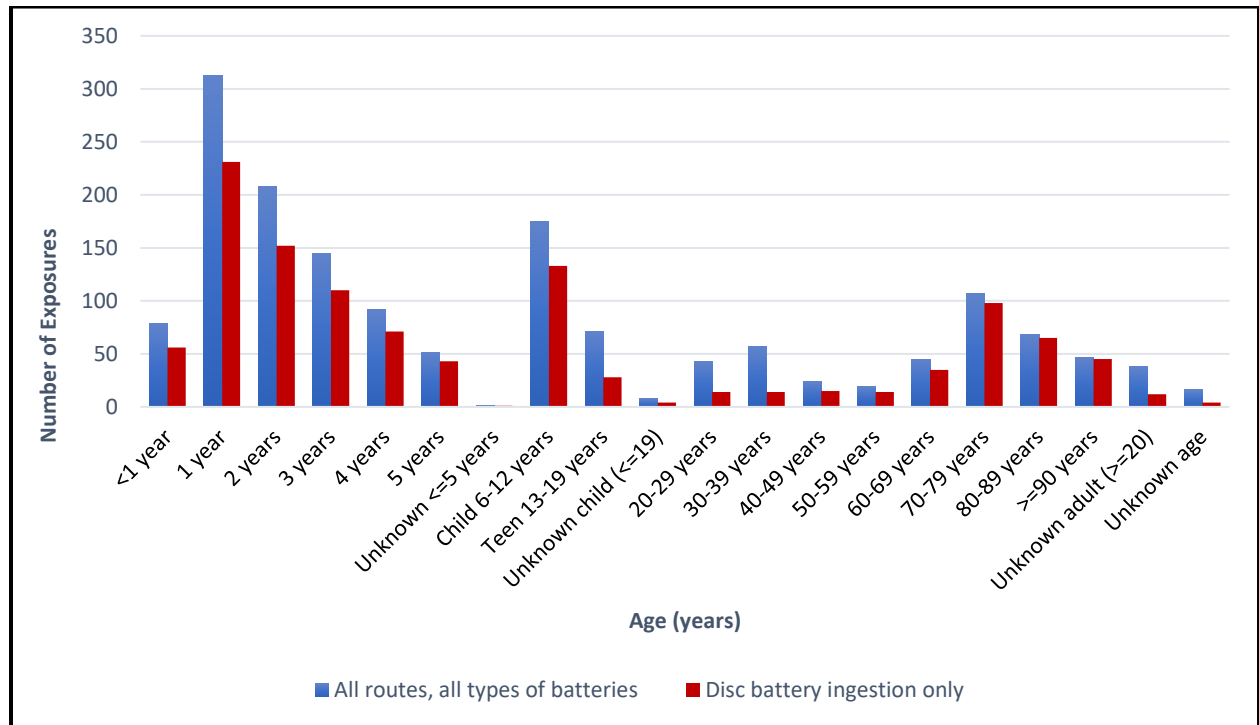


Figure 4. Disc Battery Ingestion by Types Reported to the National Battery Ingestion Hotline, July 2020 to June 2021

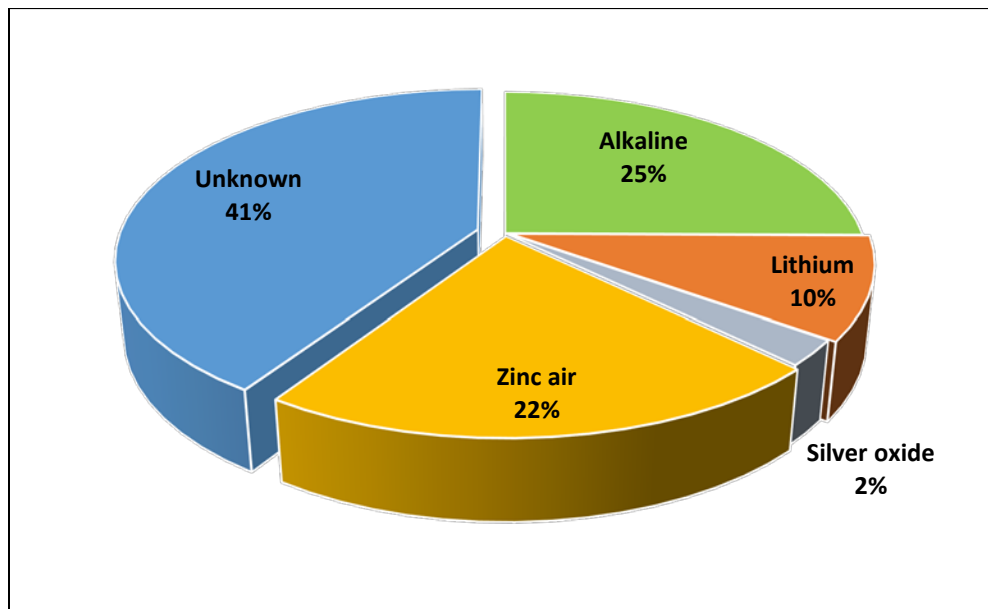


Table 5. Geographical Distribution of Caller by State, Country as Reported to the National Battery Ingestion Hotline, July 2020 to June 2021

United States	Number of Cases	United States	Number of Cases
Alabama	35	New York	116
Alaska	9	North Carolina	63
Arizona	60	North Dakota	6
Arkansas	24	Ohio	66
California	205	Oklahoma	25
Colorado	56	Oregon	26
Connecticut	30	Pennsylvania	95
D.C.	12	Puerto Rico	4
Delaware	5	Rhode Island	8
Florida	145	South Carolina	37
Georgia	62	South Dakota	5
Hawaii	12	Tennessee	56
Idaho	21	Texas	159
Illinois	80	United States Virgin Islands	2
Indiana	46	Unknown State	430
Iowa	15	Utah	34
Kansas	22	Vermont	8
Kentucky	29	Virginia	65
Louisiana	31	Washington	47
Maine	8	West Virginia	17
Maryland	39	Wisconsin	39
Massachusetts	60	Wyoming	7
Michigan	80	Country	Number of Cases
Minnesota	39	Bahamas	1
Mississippi	17	Canada	61
Missouri	42	Egypt	1
Montana	9	England	1
Nebraska	11	France	1
Nevada	18	Germany	1
New Hampshire	5	Jordan	1
New Jersey	56	Mexico	1
New Mexico	9	Uganda	1

Figure 5. Caller Site Location, Reported to the National Battery Ingestion Hotline, July 2020 to June 2021

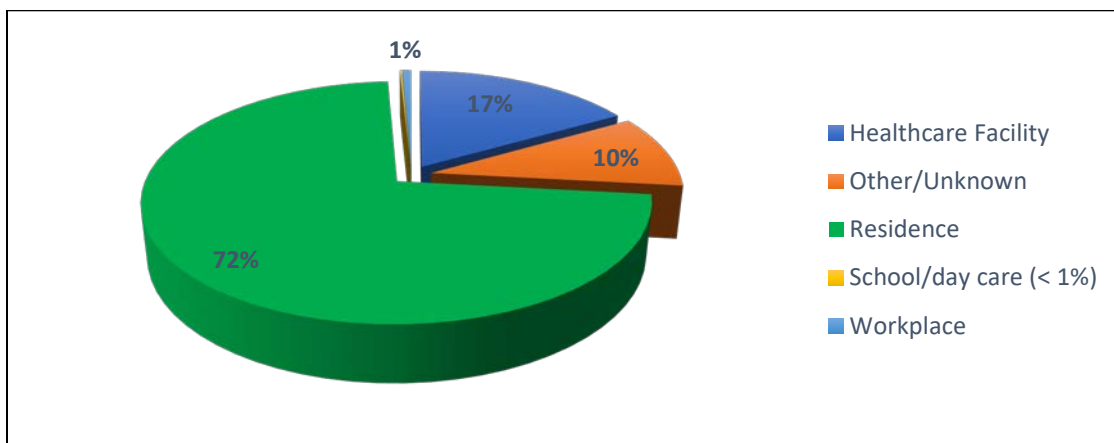


Figure 6. Medical Outcomes for Cases Reported to the National Battery Ingestion Hotline, July 2020 to June 2021.

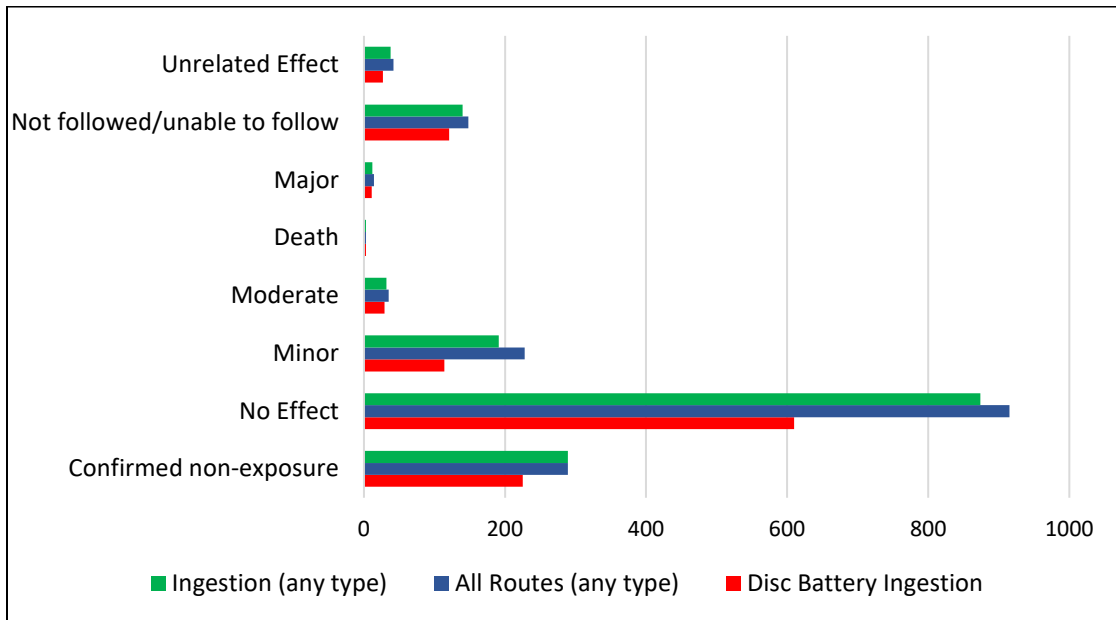


Table 6. Battery Ingestion Fatalities reported to the National Battery Ingestion Hotline, July 2020 to June 2021.

	Age of patient	Type of Battery	Details
Fatality 1	16 months	Disc battery, type unknown	Unwitnessed disc battery ingestion, not detected and removed until 3+ days following ingestion. Developed tracheoesophageal fistula. Died due to complications during hospitalization approximately 45 days post ingestion.
Fatality 2	4 years	Lithium coin cell	Reported to NBIH posthumously. Unwitnessed disc battery ingested, remained in esophagus for a prolonged period. Developed aortoesophageal fistula and died in the operating room.
Fatality 3	20 months	Disc battery, type unknown	Reported to NBIH posthumously. <i>Suspected</i> battery ingestion based on the findings from the autopsy report which showed upper gastrointestinal bleed from esophageal fistula. Battery was never found and ingestion was not confirmed.

Figure 7. Battery Source by Device for Cases Reported to the National Battery Ingestion Line, July 2020 to June 2021.

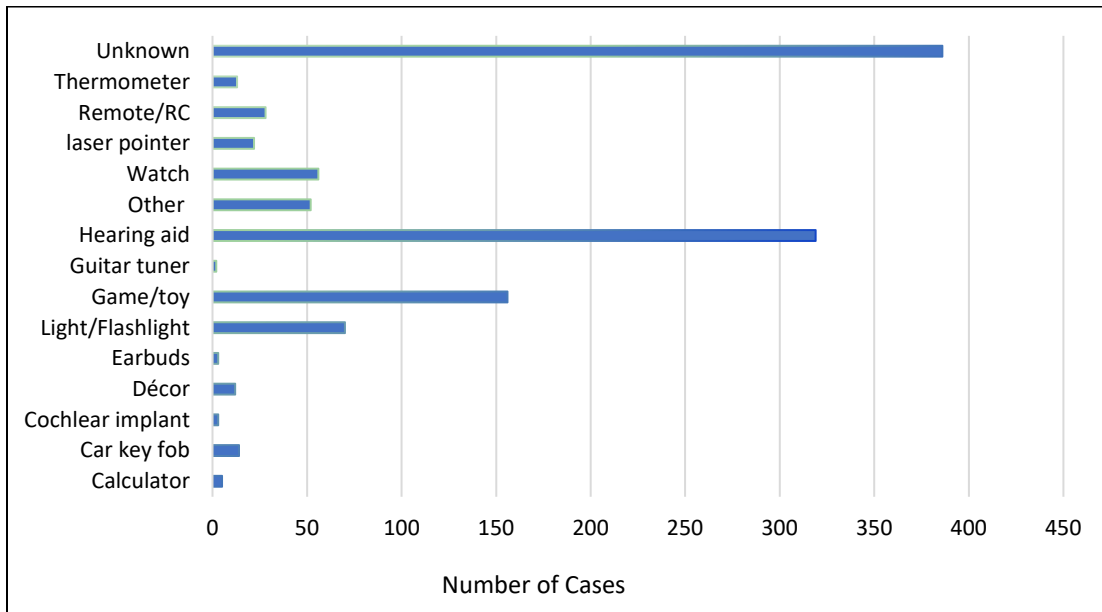


Figure 8. Battery Size, Cases Reported to the National Battery Ingestion Line, July 2020 to June 2021.

