

National Battery Ingestion Hotline

1-800-498-8666

July 1, 2021 to June 30, 2022 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)

July 26, 2022

For administrative questions, call 303-389-1392

Certified by the American Association of Poison Control Centers

777 Bannock Street, M/C 0180, Denver, CO 80204 | 303.389.1100 | www.rmpds.org

EXECUTIVE SUMMARY

This report summarizes 1,891 human battery exposures reported to the Rocky Mountain Poison Center's National Battery Ingestion Hotline (NBIH) during the 12-month period from July 1, 2021 through June 30, 2022. Of this total, 1,207 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 were a total of 3,413 human ingestion exposures involving disc batteries: 2,278 (67%) specifically involving children 0-5 years of age. Similar to our hotline data, the most common age in this range was 1-year old (n=820) followed by 2-year-old children (n=536). In the age range of 6-12 years there were 366 cases. For teenagers (13-19 years) there were 99 cases. For cases involving 20 to 59-year-old adults, there were 194 cases, and there were 396 (12% of all disc battery ingestion exposures) cases involving adults greater than 60 years. Comparing these findings to the previous year, disc battery ingestion nationally was **down** overall by 2.8%.

Regarding exposures to disc battery ingestion reported to NPDS nationally, medical outcomes included 1,303 cases with no effects, 233 with minor effects, 78 with moderate effects, and 26 with major effects. There were 3 deaths reported (1 reported directly to the NBIH, and 2 by indirect reports in which there was no poison center involvement). Of note, 84% of cases were either referred to or originated from healthcare facilities (HCF).

In children aged 0-5 years, there were 2,278 disc battery ingestion exposures reported to NPDS during this same time period (Table 3). Medical outcomes included 836 with no effects, 128 with minor effects, 50 with moderate effects, and 24 with major effects. The 2 "indirect" deaths mentioned above were in this age group and involved no regional poison control center input. Similar to the overall NPDS data, 86% of cases were either referred to or originated from healthcare facilities.

Figure 2 shows a slight downward trend over the past 4-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 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 the majority (57%) of exposures in the fourth 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. Interestingly, however, these types of “therapeutic errors” decreased by 35% from the previous contract year. Therapeutic errors represented 9% (n=111) of all disc battery ingestions, all occurring in the adult age range with 79% specifically in the 60 years old and above group. Of all disc battery exposures, the disc battery type was unknown in 35% of cases (Figure 4). 27% of cases involved alkaline disc batteries while another 25% of cases involved zinc-air batteries and 11% 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 (263), Texas (195), and Florida (170). This is not surprising as these three states are in the top 5 most populated states according to US Census numbers. There were also 66 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 (76%) followed by healthcare facilities (14%) (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 [1057, 994] followed by minor [224, 197], moderate effect [56, 56], and major effect [1, 1]. Of these cases, [251, 235] were lost to follow up. There was 1 fatality reported to the NBIH (Table 6 for details) as well as 1 case resulting in a Major outcome. There were [360, 355] cases where it was later confirmed that there was no exposure after all (battery was located) and there were [58, 51] cases where the caller reported signs and symptoms deemed unrelated to battery exposure. There were 1,207 cases where **disc battery ingestion** was confirmed or suspected. Medical outcomes reported specifically involving disc battery ingestion were as follows: no effect (590) followed by minor (118), moderate effect (34), and zero with major effects. Of these cases, 156 were lost to follow up and there was 1 fatality as mentioned above (Table 6). There were 276 cases where it was confirmed that there was no exposure and there were 32 cases where the caller reported signs and symptoms unrelated to battery exposure. Disc batteries were the most common battery type involved in human exposures. The percentage of cylindrical alkaline battery exposure cases from total human battery exposure cases reported to the NBIH was 31% (n=588), which is higher than the previous contract year (25%). When the source of the battery was known (Figure 7), hearing aids (316) were the most common devices associated with human battery exposures. Of note, 462 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 (169). The most common size of disc batteries associated with human exposures when known, was 10-14 mm (484) followed by batteries under 10 mm (207), ≥ 20 mm (138), and 15-19 mm (5). Unfortunately, for 373 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. We are hopeful to continue seeing the trend of disc battery ingestion go down 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 2021 to June 2022

Age	Female	Male	Unknown gender	All routes, all types of batteries	Disc Battery Ingestion
<1 year	59	48	2	108	64
1 year	165	212	2	379	257
2 years	99	156	0	255	170
3 years	68	112	3	183	122
4 years	45	83	0	128	85
5 years	19	38	0	57	38
Unknown age but ≤ 5 years	1	2	0	3	1
6 to 12 years	49	136	0	184	125
13 to 19 years	51	48	0	99	30
Unknown Child (≤ 19 years)	0	2	7	9	8
20-29 years	30	34	0	64	25
30-39 years	22	37	1	60	16
40-49 years	15	21	0	36	12
50-59 years	18	13	0	31	23
60-69 years	29	23	0	52	45
70-79 years	38	40	1	79	79
80-89 years	32	32	0	64	58
≥ 90 years	25	13	1	39	37
Unknown Adult (≥ 20 years)	15	23	0	38	7
Unknown Age	5	10	8	23	5
Total:	785	1,083	25	1,891	1,207

Figure 1. National Battery Ingestion Hotline Case Volume Characterization, July 2021 to June 2022

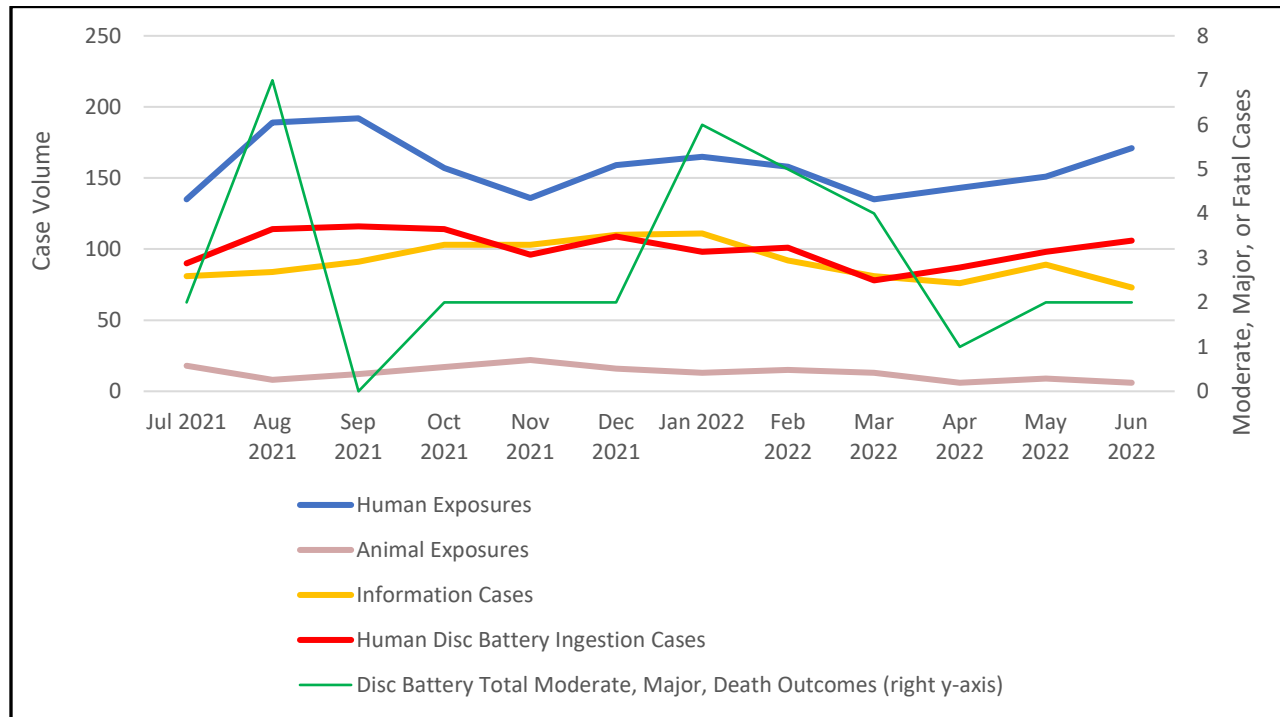


Table 2. National Poison Data System, Human Disc Battery Ingestion Exposures and Outcomes, July 2021 to June 2022, All Ages

Total Number of Ingestions	Age 0-5 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
3,413	2,278	366	99	194	396	84	1,303	233	78	26	3*

*2 of the deaths were by *indirect* report to regional poison centers, not direct poison center consultation, both 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 7/23/2022].

Table 3. National Poison Data System, Human Disc Battery Ingestion Exposures and Outcomes, July 2021 to June 2022, Age 0 to 5 years

Number of Ingestions	% Treated in hospital	No Effect	Minor	Moderate	Major	Death
2,278	86	793	120	44	22	2*

Data used by permission: American Association of Poison Control Centers, National Poison Data System. www.aapcc.org.
 *2 of the deaths were by *indirect* report to regional poison centers, not direct poison center consultation.
 [accessed on 7/23/2022].

Figure 2. 4-Year Trend of National Battery Ingestion Hotline, July 2018 to June 2022

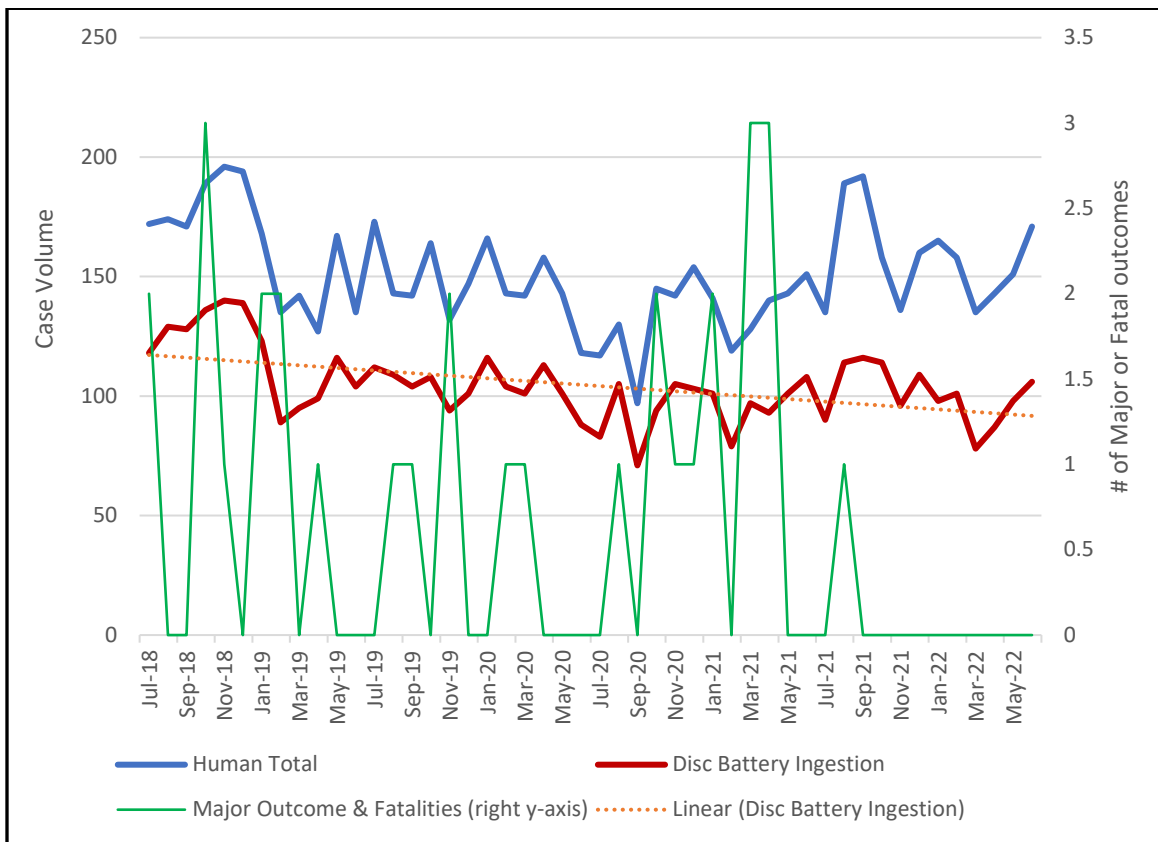


Table 4. National Battery Ingestion Hotline Exposures by Gender, July 2021 to June 2022

Gender	Number of Exposures
Male	1083
Female	785
Unknown	25

Figure 3. Human Battery Exposure by Age Range and Type Reported to the National Battery Ingestion Hotline, July 2021 to June 2022

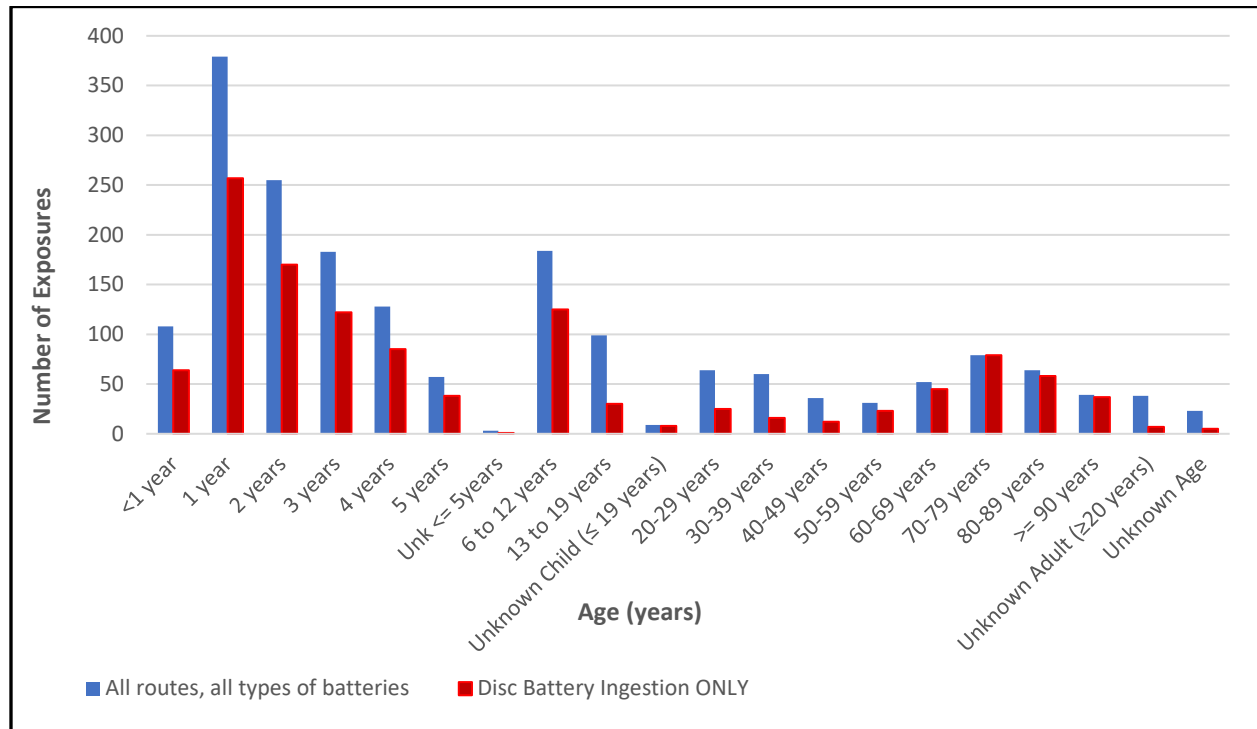


Figure 4. Disc Battery Ingestion by Types Reported to the National Battery Ingestion Hotline, July 2021 to June 2022

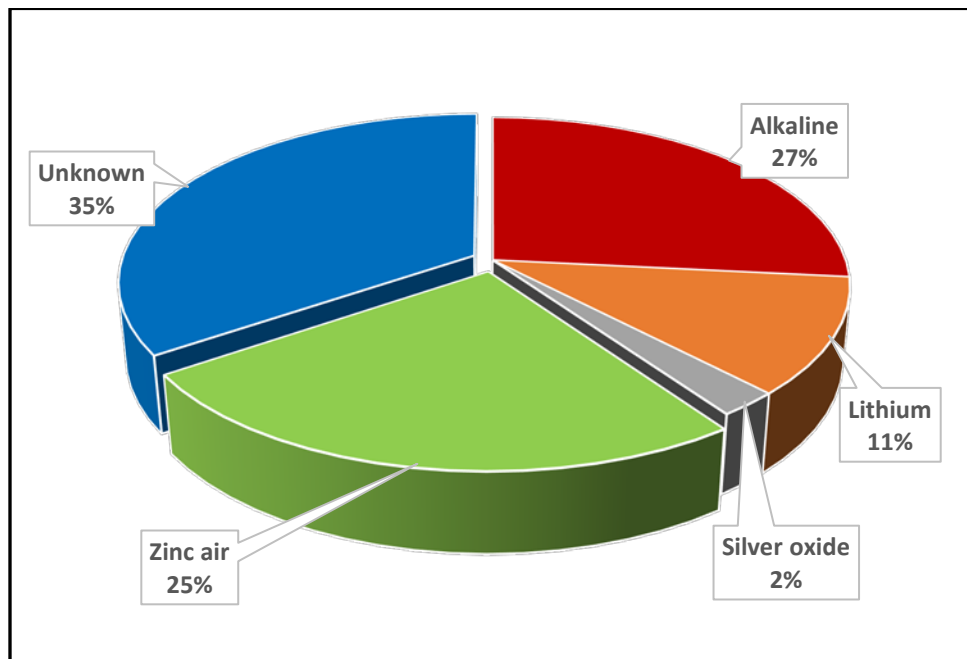


Table 5. Geographical Distribution of Caller by State, Country as Reported to the National Battery Ingestion Hotline, July 2021 to June 2022

United States	Number of Cases	United States	Number of Cases
Alabama	35	North Dakota	5
Alaska	6	Ohio	101
Arizona	70	Oklahoma	33
Arkansas	18	Oregon	31
California	263	Pennsylvania	100
Colorado	42	Puerto Rico	4
Connecticut	20	Rhode Island	5
D.C.	3	South Carolina	24
Delaware	5	South Dakota	8
Florida	170	Tennessee	47
Georgia	72	Texas	195
Hawaii	11	United States Virgin Islands	0
Idaho	13	Unknown State	1
Illinois	101	Utah	30
Indiana	59	Vermont	10
Iowa	23	Virginia	79
Kansas	19	Washington	63
Kentucky	29	West Virginia	15
Louisiana	29	Wisconsin	39
Maine	11	Wyoming	8
Maryland	58	Country	Number of Cases
Massachusetts	53	Barbados	1
Michigan	77	Canada	66
Minnesota	48	Ghana	1
Mississippi	14	England	1
Missouri	39	Indonesia	1
Montana	14	Germany	1
Nebraska	11	Ireland	1
Nevada	26	Israel	1
New Hampshire	9	Jamaica	1
New Jersey	59	Netherlands	1
New Mexico	11	Saudi Arabia	1
New York	133	South Korea	1
North Carolina	54	Sweden	1

Figure 5. Caller Site Location, Reported to the National Battery Ingestion Hotline, July 2021 to June 2022

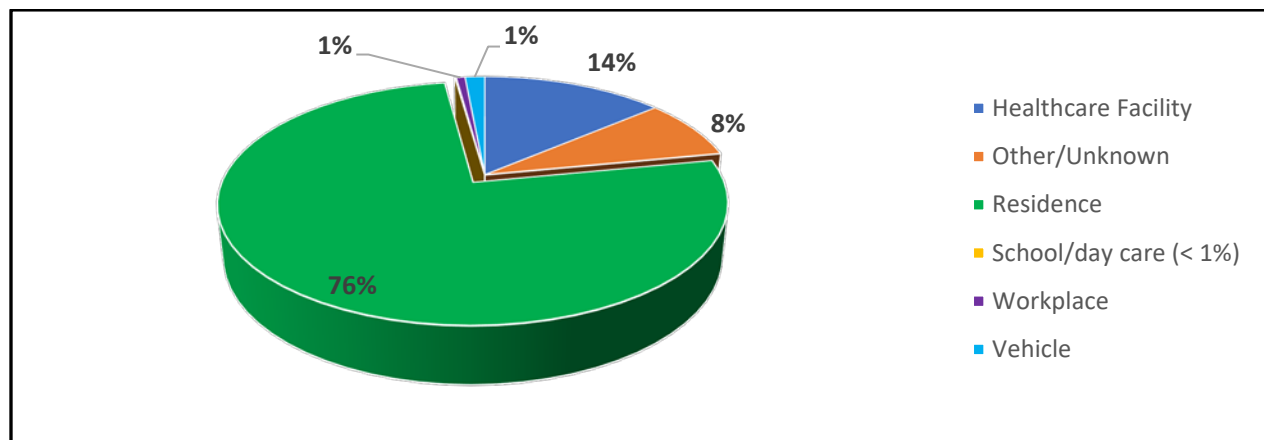


Figure 6. Medical Outcomes for Cases Reported to the National Battery Ingestion Hotline, July 2021 to June 2022.

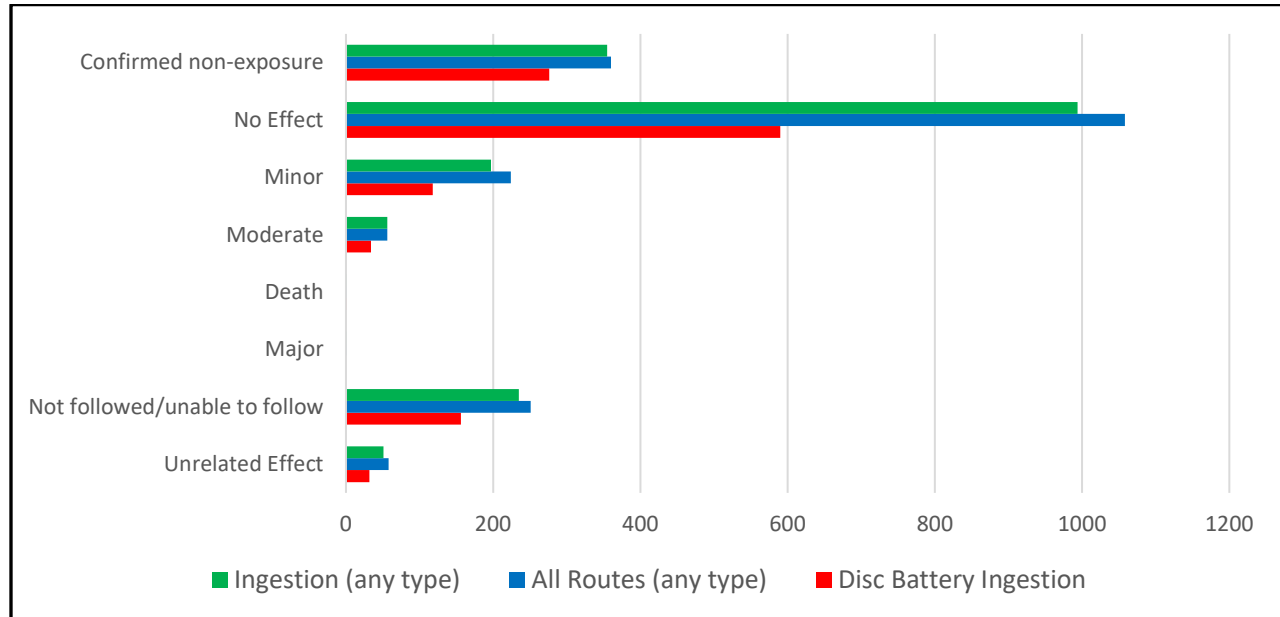


Table 6. Battery Ingestion Fatality and Major Outcome reported to the National Battery Ingestion Hotline, July 2021 to June 2022.

	Age of patient	Type of Battery	Details
Fatality	> 80 years	Alkaline hearing aid battery, 11.6 mm	Elderly adult suspected of swallowing 2 of his hearing aid batteries for reasons unknown. X-ray confirmed location (stomach and intestines). Details not provided, but we learned he collapsed at home and subsequently passed away a few days later.
Major Outcome	31 years	Lithium coin cell	Call reported to hotline 2 months after supposed ingestion occurred involving adult who swallowed multiple batteries – size/type unknown – and suffered esophageal burns. Details were not provided surrounding ingestion.

Figure 7. Battery Source by Device for Cases Reported to the National Battery Ingestion Line, July 2021 to June 2022.

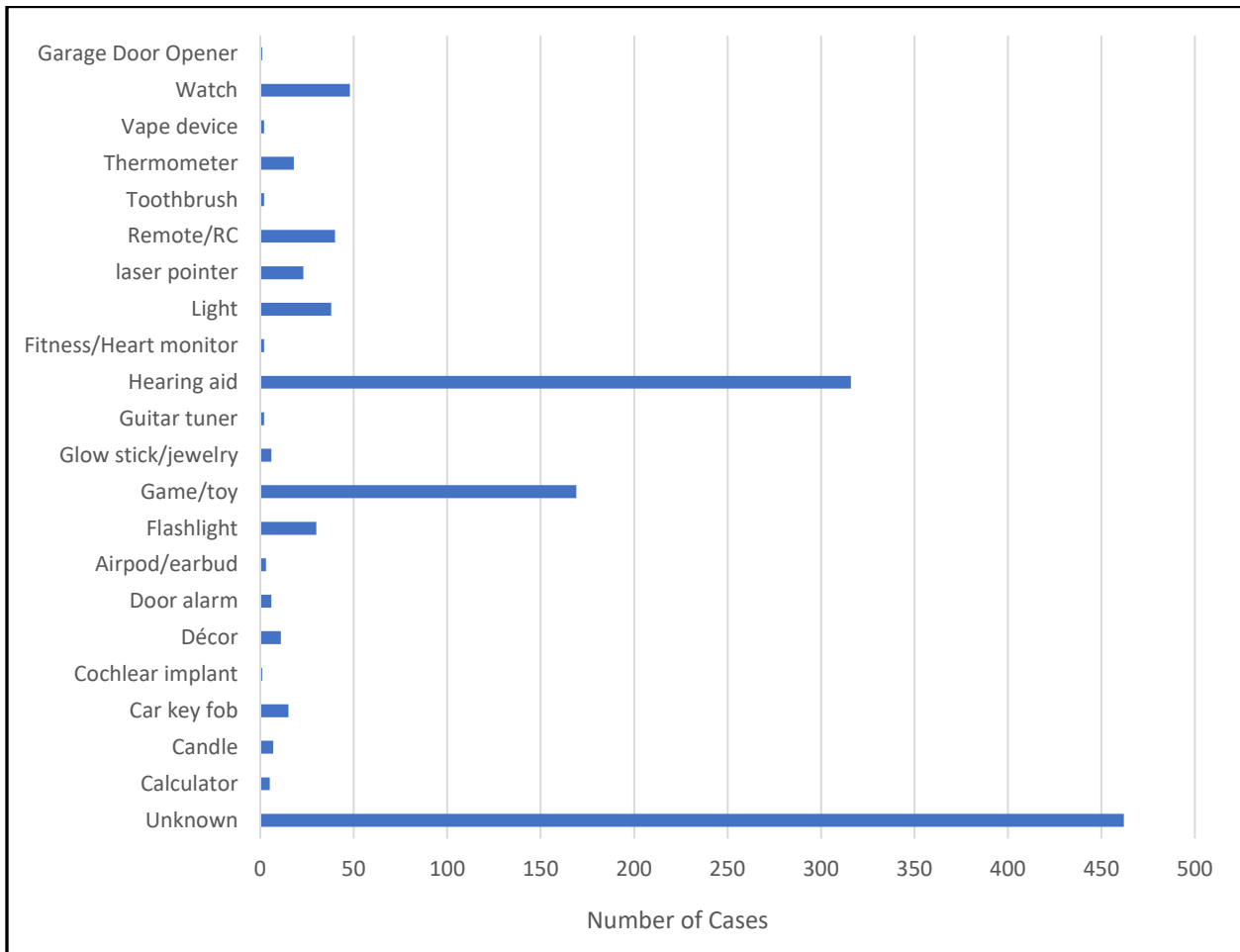


Figure 8. Battery Size, Cases Reported to the National Battery Ingestion Line, July 2020 to June 2021.

