

# COVID-19 and Pediatric Ingestions

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On March 13, 2020, the United States declared the coronavirus disease 2019 outbreak a national emergency.<sup>1</sup> Consequently, the abrupt shift in the school and home dynamics, combined with ensuing psychosocial and economic household stressors, placed children at increased risk of harm.<sup>2</sup> In particular, early 2020 data indicated an increase in household cleaner and disinfectant exposures.<sup>3</sup> However, the impact of the pandemic on overall pediatric ingestions is unclear. Our objective was to compare national trends in pediatric ingestions during the pandemic to a similar pre-pandemic period.

## METHODS

All closed cases of ingestions involving children aged  $\leq 19$  years reported to US poison control centers from March 13 to December 31, 2020 (pandemic), were compared with an identical period from 2017 to 2019 (pre-pandemic). A closed case is either one in which the regional poison center determined no further follow-up or recommendations were required or no further information on the case was available.<sup>4</sup> All US poison control center operations and reporting were consistent across the study period. Aggregate national data were abstracted from the American Association of Poison Control Centers National Poison Data System.<sup>4</sup> Information requests and animal calls were excluded. Abstracted data included age group,

sex, substance ingested, reason, exposure and management site, disposition, and medical outcome. Clinically significant outcomes were defined as a moderate or major effect or death.<sup>4</sup> Descriptive statistics were used to describe the study cohorts, and categorical variables were compared by using the  $\chi^2$  test. The significance level was set to  $\alpha < .05$ . The study was exempt from review by our institutional review board.

## RESULTS

There were 861 626 pediatric ingestions during the pandemic, representing a 6.3% absolute decrease compared with the pre-pandemic years (Fig 1A). The pandemic period had an increase in proportion of teenagers and children aged  $\leq 5$  years compared with the pre-pandemic years (Table 1). There was a relative increase in intentional ingestions accounting for 10.8% of all ingestions during the pandemic period versus 10.3% during the pre-pandemic period (0.5% difference, 95% confidence interval: 0.4%–0.6%,  $P < .001$ ) (Table 1). In addition, there was a relative increase in ingestions occurring at home during the pandemic period when compared with the pre-pandemic period (1.9% difference, 95% confidence interval: 1.8%–2.0%,  $P < .0001$ ).

Ingestions of hand sanitizers increased by 43% (18 099 vs 12 653,  $P < .0001$ ) and melatonin

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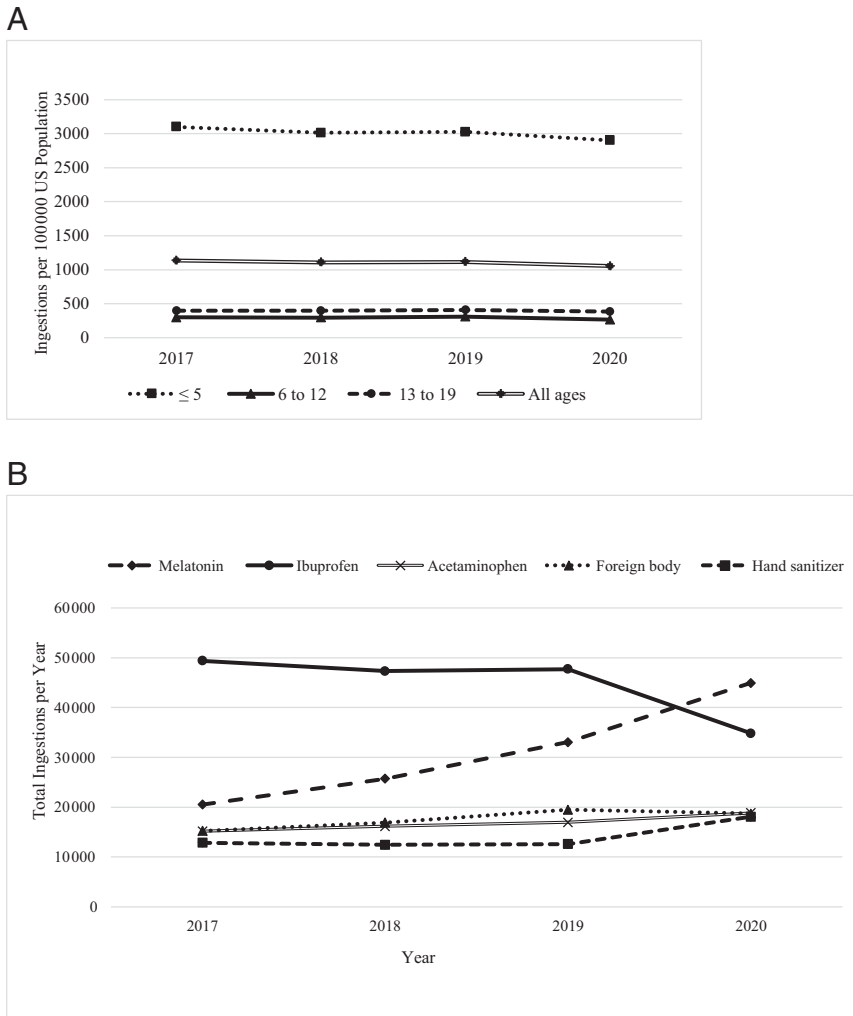
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**FIGURE 1** Pediatric ingestion trends 2017–2020. A, Rate of ingestion by age group ( $\leq 5$  years, 6–12 years, and 13–19 years). Population estimates are based on the US Census Bureau. B, Total yearly ingestions of the most common substances in 2020 (melatonin, ibuprofen, acetaminophen, foreign body, and hand sanitizer) compared with the previous 3 years.

by 70% (44 957 vs 26 431,  $P < .0001$ ) during the pandemic period. Additionally, melatonin ingestions supplanted analgesics as the most frequently ingested substance during the pandemic period (Fig 1B). Clinically significant outcomes associated with ingestions increased during the pandemic period (4.2% vs 3.6%,  $P < .001$ ). Whereas overall ingestions managed at a health care facility decreased by 14.2% during the pandemic, there was an increase in the proportion of

adolescents ( $P < .001$ ), intentional ingestions ( $P < .001$ ) and hospitalizations ( $P < .001$ ) (Table 1).

## DISCUSSION

Ingestion-related calls to poison control centers and those subsequently managed at health care facilities decreased during the pandemic. The latter is consistent with a report of an overall decrease in pediatric

emergency department visits.<sup>5</sup> This decline may be secondary to a combination of social restrictions, apprehensions in seeking care at a medical center, and increased parental supervision due to work-from-home advisories.<sup>5,6</sup> The majority of ingestions occurred at the home, aligning with school and child care closures during the pandemic.

The increase in clinically significant ingestions observed in our study could be a consequence of misperceptions of health care facility safety during the pandemic. This may have subsequently contributed to delays in presentations and potentially worse outcomes.<sup>6</sup>

The increase in the proportions of adolescent and intentional ingestions may reflect heightened social, emotional, and psychological stressors on this age group. Initiatives focusing on implementing support systems for this vulnerable population are warranted. The heightened hand sanitizer and melatonin ingestions parallel the ubiquitous rise in the sale and use of such products during the pandemic and ease of accessibility among children.<sup>3,7</sup> This demands continued attention, given reports of methanol-contaminated hand sanitizer ingestions with severe adverse outcomes.<sup>8</sup>

Limitations include voluntary reporting to poison control centers and reliance on secondhand narratives, which may include partially incomplete information. Additionally, drug concentrations are rarely obtained to confirm ingestions. Finally, incomplete coding of the poison control center data may have also skewed ingestion frequencies.

**TABLE 1** Comparison of Pediatric Ingestions During the Pandemic (2020) Versus Prepandemic Period (2017–2019)

Characteristic	Year, n (%)		P
	2017–2019; 3-year Average	2020	
All Ingestions	n = 2 757 796; n = 919 265	n = 861 626	—
Age, y			<.001
≤5	712 708 (77.5)	670 352 (77.8)	—
6–12	87 006 (9.5)	76 403 (8.9)	—
13–19	119 551 (13.0)	114 871 (13.3)	—
Sex			<.001
Male	470 376 (51.2)	435 982 (50.6)	—
Female	446 465 (48.6)	422 762 (49.1)	—
Unknown	2424 (0.3)	2882 (0.3)	—
Reason			<.001
Unintentional	813 237 (88.5)	758 422 (88.0)	—
Intentional	94 560 (10.3)	92 918 (10.8)	—
Other	11 468 (1.2)	10 286 (1.2)	—
Exposure site			<.001
Residence	882 457 (96.0)	843 935 (97.9)	—
School	17 554 (1.9)	3475 (0.4)	—
Other	19 255 (2.1)	14 216 (1.6)	—
Management site			<.001
Managed on-site (non-HCF)	713 205 (77.6)	687 181 (79.8)	—
Patient already in or en route to HCF when PCC called	146 284 (15.9)	125 478 (14.6)	—
Patient was referred by PCC to HCF	44 432 (4.8)	43 642 (5.1)	—
Other	15 344 (1.7)	5 325 (0.6)	—
Outcome <sup>a</sup>			<.001
No effect	208 499 (22.7)	186 261 (21.6)	—
Minor effect	86 566 (9.4)	84 283 (9.8)	—
Clinically significant	33 187 (3.6)	35 906 (4.2)	—
Death	69 (0.0)	81 (0.23)	—
Other	591 013 (64.3)	555 218 (64.4)	—
Ingestion managed at a HCF	n = 438 853; n = 146 284	n = 125 478	—
Age, y			<.001
≤5	62 619 (42.8)	45 728 (36.4)	—
6–12	11 151 (7.6)	9980 (8.0)	—
13–19	72 515 (49.6)	69 770 (55.6)	—
Sex			<.001
Male	59 676 (40.8)	47 192 (37.6)	—
Female	86 399 (59.1)	78 106 (62.2)	—
Unknown	210 (0.1)	180 (0.1)	—
Reason			<.001
Unintentional	72 067 (49.3)	52 714 (42.0)	—
Intentional	70 910 (48.5)	69 838 (55.7)	—
Other	3307 (2.3)	2926 (2.3)	—
Outcome <sup>a</sup>			<.001
No effect	50 487 (34.5)	38 966 (31.1)	—
Minor effect	41 986 (28.7)	38 382 (30.6)	—
Clinically significant	28 679 (19.6)	30 365 (24.2)	—
Death	61 (0.0)	71 (0.23)	—
Other	25 132 (17.2)	17 765 (14.2)	—
Disposition			<.001
Hospitalized	54 983 (37.6)	54 674 (43.6)	—
ICU	15 842 (10.8)	14 591 (26.7)	—
Treated and released	85 921 (58.7)	66 200 (52.8)	—
Other	5380 (3.7)	4604 (3.7)	—

HCF, health care facility; PCC, poison control center; —, not applicable.

<sup>a</sup> No effect: no signs or symptoms.<sup>4</sup> Minor effect: minimally bothersome symptoms; self-limited; resolved without intervention (eg, self-limited gastrointestinal symptoms).<sup>4</sup> Clinically significant outcomes include moderate effect or major effect or death. Moderate effect: systemic symptoms requiring intervention; not life-threatening (eg, brief seizure readily resolved with treatment; high fever).<sup>4</sup> Major effect: life-threatening symptoms (eg, status epilepticus, respiratory failure requiring intubation).<sup>4</sup> Other: cases that were not followed or unable to be followed to a known outcome but judged as likely nontoxic exposures, exposures with minimal clinical effects, or exposure deemed not responsible to the effect.<sup>4</sup>

## CONCLUSIONS

Pediatric ingestion calls to poison control centers decreased during the pandemic. However, there were significant increases in intentional hand sanitizer and melatonin ingestions and those with clinically significant outcomes. Further studies are required to determine the long-term impact of the pandemic on pediatric ingestions to institute appropriate preventive measures and resource allocation.

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