Marijuana exposures and poisonings of children aged 12 and under.

INTRODUCTION

- Marijuana exposures in children have been rising in the US and Canada
- There are two principal data series tracking pediatric exposure to cannabinoids which have complementary strengths:
  - The Pediatric Health Information System (PHIS) which is a database covering approximately 50 children's hospitals in the US **(1,2,3)**
  - The National Poison Data System (NPDS) which covers the entire population of the 50 United States, the District of Columbia, and all US territories **(4,5)**
- Two recent studies with PHIS show sharp increases, as does a much older longitudinal study with the second data series, NPDS.
- This poster is meant to provide an updated longitudinal report based on the NPDS data.

METHODS

America's Poison Centers represents the 55 accredited US poison centers. Data concerning reported exposures are entered into NPDS by the regional poison centers which most commonly are alerted to cases by patients, parents, or healthcare facilities. NPDS issues annual reports, quantifying reported exposures to various toxic substances across the country. (Those reports were accessed for each year from 2000 to 2023, the most recent year available.

In 2000, the NPDS Annual Report had one category for marijuana (the term they used). As more marijuana products have become available, that category has been subdivided, with the overall rubric renamed "cannabinoids and analogs." *In the most recent NPDS Annual Report (2023), there were 17 subcategories of cannabinoids and analogs, categories which including marijuana: concentrated extracts, marijuana: dried plant, and marijuana: edible preparations* **(Table)**. All NPDS Annual Report data from 2007 and beyond that indicate exposure to marijuana reflect cases for which marijuana was the only substance to which reported exposure occurred and was not part of a polysubstance exposure.

Using the NPDS Annual Reports for each year, the number of exposures of children under 6 years of age reported to NPDS was tabulated. NPDS began tracking the 6-12 age group in 2009. The number of reported exposures for the 6–12 group was tabulated for each year from 2009 to 2023. Tabulations for both age groups included exposures to all "cannabinoids and analogs" subcategories except for three: CBD, marijuana: pharmaceutical preparation, and synthetic cannabinoids, analogs and precursors; exposures within any of those subcategories were omitted.

The subcategory of marijuana: edible preparations was added to the NPDS Annual Report in 2016. For both the under 6 and the 6-12 groups, annual numbers of reported exposures to edible marijuana preparations were tabulated from 2016 through 2023. **(6)**

AUTHORS & DISCLOSURES

Raymond Bertino MD [1,A], Jerrold Leikin MD [2, A]
1. Illinois Society of Addiction Medicine; 2. School of Public Health, University of Illinois, Chicago,
A. Nothing to disclose

RESULTS

The numbers of reported exposures of children under age 6 was relatively stable between 2000 and 2009, ranging from 108 to 141, with 132 exposures in 2009 (**Figure)**. Beginning in 2010, a consistently rising number of reported exposures is seen, with the shape of the curve demonstrating acceleration (graph concave upward). In 2023, there were 8400 reported exposures, *an increase of 6363% from 2009*. The percentage increase of reported marijuana exposures in the 6-12 age group since 2009 has been even greater than that of the under 6 group and the exposure rate has also been accelerating. Total numbers of reported exposures in the 6-12 age group have been lower than those in the under-6 group, with 3023 exposures in 2023.

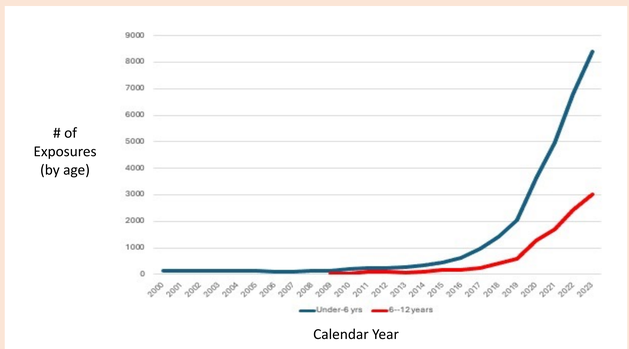
Reported exposures of children under 6 to edible preparations rose from 7 in 2016 to 4795 in 2023, while those in the 6-12 group increased from 0 in 2016 to 2025 in 2023. Edible preparations were the predominant marijuana product involved in reported exposures of children, *accounting for 57% of exposures in the under-6 age group in 2023, and for 67% in the 6-12 group*.

As mentioned in the Methods section, annual exposures to CBD, pharmaceutical preparations, and synthetic marijuana were not tabulated for the purposes of this study. There were substantial numbers of reported exposures to CBD in the under-6 age group, with 859 in the 2023. Reported exposures to pharmaceutical preparations were small: 8 in the under-6 group in 2023. The legal status of synthetic marijuana has not been affected by the recent loosening of rules in several states regarding marijuana. There were 53 such exposures in the under-6 age group in 2023.

Table

Cannabinoids and Analogs
Cannabidiol (CBD)
eCigarettes: Marijuana Device Flavor Unknown
eCigarettes: Marijuana Device With Added Flavors
eCigarettes: Marijuana Device Without Added Flavors
eCigarettes: Marijuana Liquid Flavor Unknown
eCigarettes: Marijuana Liquid With Added Flavors
eCigarettes: Marijuana Liquid Without Added Flavors
Marijuana: Concentrated Extract (Including Oils and Tinctures)
Marijuana: Dried Plant
Marijuana: Edible Preparation
Marijuana: Oral Capsule or Pill Preparation
Marijuana: Other or Unknown Preparation
Marijuana: Pharmaceutical Preparation
Marijuana: Topical Preparation
Marijuana: Undried Plant
Minor Cannabinoids
Synthetic Cannabinoids, Analogs and Precursors

Figure



Exposures of children to marijuana ages under 6 years from 2000 to 2023 – blue line.
Exposures of children to marijuana ages 6 -- 12 from 2009 to 2023 – red line.

DISCUSSION

Information compiled by The National Poison Data System indicates that reported marijuana exposures of children under 6 years of age began to increase in 2010. Data for the 6-12 age group also has shown increasing exposures. The NPDS Annual Report data show a rise of pediatric exposures of over 60-fold between 2009 and 2023 for both age groups, with an acceleration of reported exposures throughout most of the time since 2010 (i.e., both graphs are concave upward).

Many of the exposures in children under 6 years of age represent poisonings, resulting in significant numbers of hospitalizations and ICU admissions. A recent study using NPDS data for the under-6 age group from 2017 to 2021 found that 22.7% of those exposed were admitted to hospitals, with 8.1% of exposures resulting in ICU admissions. **(7)** *If those proportions held in 2023, the most recent year for which NPDS Annual Report data are available, 1907 hospitalizations in the under-6 age group would be expected, with 680 of those being ICU admissions.*

Edible preparations are responsible for the majority of marijuana exposures in both the under-6 years and the 6-12 age groups. The toxic dose of such preparations in pediatric populations is estimated to be 1.7 mg/kg. **(8)** Many edible products contain 100 mg of tetrahydrocannabinol (THC) in a small package. Ingestion of the quantity of marijuana candy found in one such package can result in serious toxicity. A recent prospective cohort study has shown that virtually all hospital admissions in the US and Canada of children under 10 years of age for severe marijuana toxicity result from ingestions of edible preparations. **(9)**

Limitations: NPDS Annual Reports do not include data that allow outcomes for specific age groups to be determined. Demographic data other than age are not available in the Annual Reports. Other studies referred to in this poster must be used to understand those aspects of this topic. Also, not all marijuana exposures are reported to poison centers. The actual number of exposures is undoubtedly higher, though the number of unreported cases is unknown.

CONCLUSION

Numbers of marijuana exposures of children have been increasing rapidly among children through the age of 12 years NPDS-reported exposures having increased more than 60-fold since in 2009. Stronger regulation of the burgeoning marijuana market is needed, with a goal of reducing childhood exposures particularly to edible marijuana products.

Requiring child-resistant packaging and further limiting the amount of THC in each package would seem to be a minimum. In addition, *the wisdom of allowing commercial marketing of sweetened, edible marijuana preparations that are attractive to children should be considered*.

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