

Self-Harm as a Contributor to the “Fourth Wave”: Suicidality in Stimulant Overdoses

Stephanie T. Weiss, MD PhD¹; Rachel Culbreath, PhD MPH²; Alyssa Falise, PhD²; Kim Aldy DO MS MBA²; Paul M. Wax, MD²; Sharan Campleman, PhD²; Jeffrey Brent, MD PhD³ on behalf of the Toxicology Investigators Consortium (the authors have no disclosures to report)

1. Translational Addiction Medicine Branch, Intramural Research Program, National Institute on Drug Abuse, National Institutes of Health, Baltimore, MD
2. American College of Medical Toxicology, Phoenix, AZ
3. University of Colorado School of Medicine, Aurora, CO

INTRODUCTION AND HYPOTHESIS

Introduction:

- The “Fourth Wave” of drug overdoses (ODs) involves stimulants, with or without co-exposure to opioids.
- A significant minority of opioid OD cases are reported to have a component of passive or active suicidality.
- We used the Toxicology Investigators Consortium (Toxic) Core Registry to assess the reasons for deliberate stimulant exposures resulting in serious toxicity.

- Hypothesis:** similar to the pattern observed for opioid ODs, a clinically significant proportion of overdoses involving pharmaceutical stimulants are characterized by some degree of suicidal intent.

Table 1: Characteristics of Patients Aged 11+ with Stimulant Exposures Recorded in the Toxic Core Registry, 2014-2023

	All cases of stimulant exposures n = 4770	Intentional stimulant exposures n = 3890	Attempt at self-harm n = 1020	Stimulant misuse n = 2278
Median Age (IQR)	33 (23 – 43)	31 (22 – 42)	20 (15 – 34)	34 (26 – 44)
Sex (%)				
Male	2995 (62.8)	2482 (63.8)	450 (44.1)	1612 (70.8)
Female	1753 (36.8)	1387 (35.7)	557 (54.6)	658 (28.9)
Unspecified	22 (0.5)	21 (0.5)	13 (1.3)	8 (0.4)
Race and ethnicity (%)				
American Indian/Alaska Native	54 (1.1)	40 (1.0)	12 (1.2)	23 (1.0)
Asian	45 (0.9)	42 (1.1)	14 (1.4)	24 (1.1)
Black/African	731 (15.3)	560 (14.4)	122 (12.0)	341 (15.0)
Hawaiian/Pacific Islander	3 (0.1)	3 (0.1)	0	3 (0.1)
Hispanic (NOS)	571 (12.0)	463 (11.9)	88 (8.6)	288 (12.6)
Mixed (NOS)	45 (0.9)	32 (0.8)	12 (1.2)	16 (0.7)
Non-Hispanic white	2390 (50.1)	1961 (50.4)	546 (53.5)	1140 (50.0)
Other	10 (0.2)	10 (0.3)	4 (0.4)	5 (0.2)
Unknown/unspecified	921 (19.3)	779 (20.0)	222 (21.8)	438 (19.2)

METHODS

- Inclusion Criteria:** 2014-2023 Toxic Core Registry cases age ≥11 with intentional pharmaceutical or non-pharmaceutical stimulant exposures
 - Pharmaceutical stimulants = Food and Drug Administration-approved medications
 - All other stimulants = non-pharmaceuticals
- Comparators:** sedative-hypnotics, opioid analgesics, non-opioid analgesics, and antidepressants

Figure 1: Flow Diagram Showing Selection of Included Cases

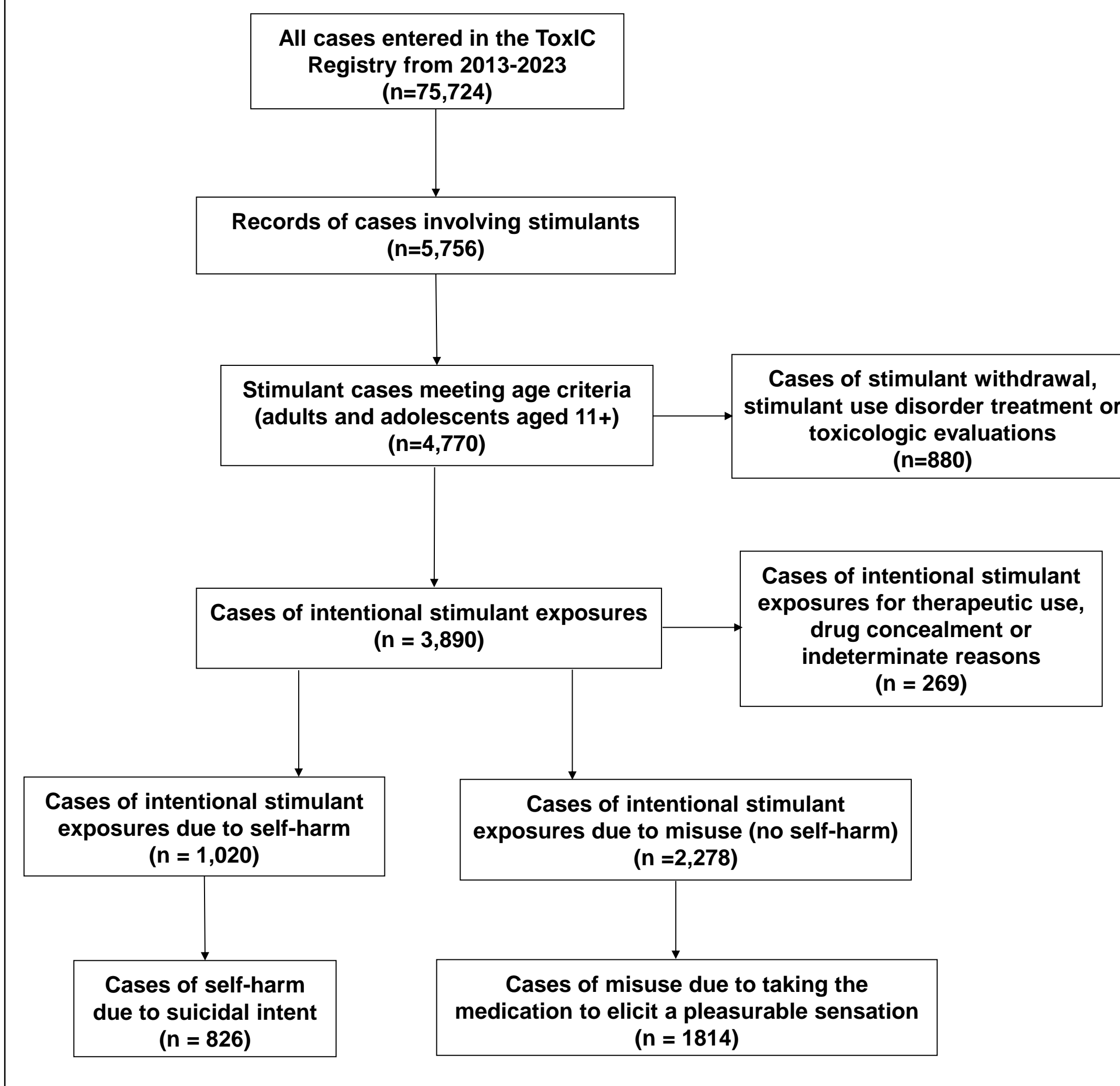
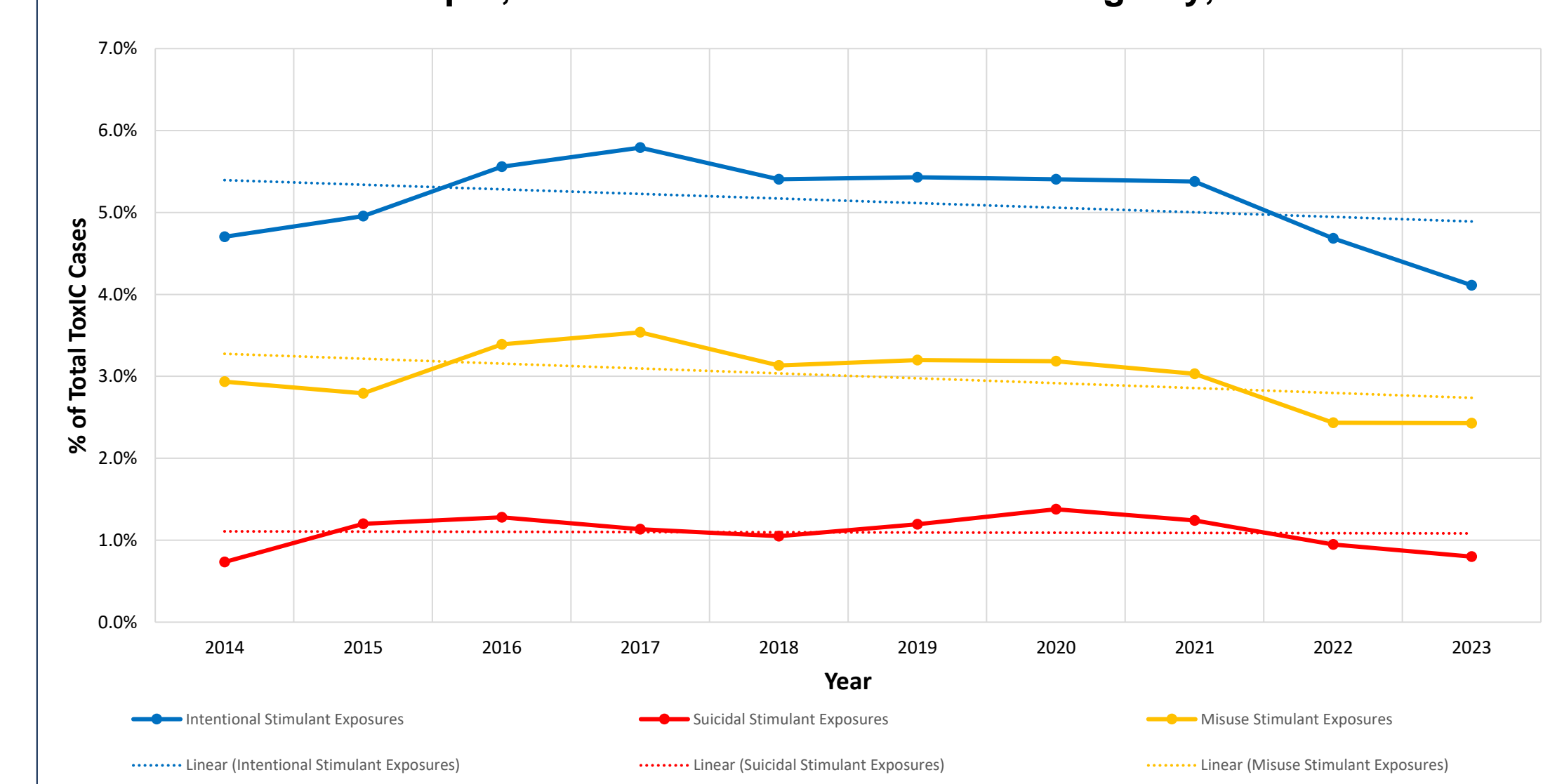


Table 2: Patients Presenting Following Use of Pharmaceutical Stimulants, Non-pharmaceutical Stimulants, and Both for Purposes of Self-Harm (n=1020)

	Pharmaceutical n = 847	Non-Pharmaceutical n = 110	Both pharm and non-pharm n = 63	Test statistic (df), p-value
Suicidal (n=826; 81.0%)*				
n (%)*	702 (85.0%)	71 (8.6%)	53 (6.4%)	P<0.002**
Age, median (IQR)	17.0 (15.0, 31.0)	35.0 (26.0, 40.5)	37.0 (24.0, 45.0)	102.4 (2), p<0.001
Male, n (%)	283 (40.3%)	47 (66.2%)	28 (52.8%)	X ² = 18.6 (2) p<0.001
No Suicidal Intent (n=40; 3.9%)*				
n (%)*	30 (75.0%)	10 (25.0%)	0	
Age, median (IQR)	17.0 (13.5, 29.8)	39.0 (34.0, 51.3)	-	11.6 (1), p<0.001
Male, n (%)	11 (36.7%)	7 (70.0%)	-	p=0.14
Unknown (n=154; 15.1%)*				
n (%)*	115 (74.7%)	29 (18.8%)	10 (6.5%)	
Age, median (IQR)	19.0 (15.0, 31.0)	36.0 (29.0, 42.0)	33.0 (30.3, 50.8)	27.5 (2), p<0.001
Male, n (%)	66 (57.9%)	8 (27.6%)	4 (40.0%)	p=0.008

*Percentages reflective of suicidal intent category totals. P-value represents association among three mutually exclusive pharmaceutical categories and suicidal intent. IQR=interquartile range. Pharmaceutical vs. non-pharmaceutical stimulant categories obtained from the initial reason for encounter. Kruskal-Wallis tests were used to compute statistically significant differences for ages. Fisher's Exact Test was computed for categorical variables since expected cell counts <5.

Figure 2: Yearly Proportions of Stimulant Exposure Cases Classified as Intentional, Suicide Attempts, and Misuse in the Toxic Core Registry, 2014-2023



CONCLUSIONS

- Similar to previous findings for opioid ODs:
 - >25% of intentional stimulant ODs were self-harm attempts.
 - Most suicidal cases involving stimulants used pharmaceutical stimulants rather than illicit stimulants.
- An assessment of potential suicidality should be considered in all patients with stimulant ODs, particularly in cases of pharmaceutical stimulant ODs.