

# Intent, Substance, and Care: Characteristics of Adolescent Ingestion Hospitalizations

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**OBJECTIVES:** To characterize the patient population of adolescents hospitalized at a tertiary center for ingestions and identify opportunities to improve health care delivered and resources offered to these adolescents.

**METHODS:** Retrospective study of a consecutive sample of adolescent patients (12–18 years old) discharged from the hospitalist service at a large academic pediatric tertiary care center from May 2017 through April 2018. Data were collected regarding patient and hospital encounter characteristics including length of stay, admission service, reason for ingestion, substance(s) ingested, previous suicidal ideation (SI) screening, sexual history documentation, pregnancy testing, disposition at discharge and follow-up with primary care physicians (PCPs).

**RESULTS:** Most hospitalizations for ingestions were reported as intentional suicide attempts (79%). Most commonly, adolescents ingested exclusively prescription medications (45%) or over-the-counter medications (32%). Of adolescents with a reported suicide attempt for whom PCP records were available, 56% did not have SI screening documented in the medical record. One-quarter of adolescents hospitalized for an ingestion did not have a sexual history documented, and 11% of female patients were not tested for pregnancy before discharge. A majority (66%) of the adolescents with PCP records available did not follow-up with their PCP within 2 months after their hospitalization.

**CONCLUSIONS:** On the basis of our study results, opportunities to improve adolescent health include increased screening for SI and mental health symptoms throughout medical environments, comprehensive risk assessment of all adolescents hospitalized for an ingestion and increased guidance for caregivers of adolescents regarding prescription and over-the-counter medication storage in the home.

## ABSTRACT

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Dr Titus contributed to the conceptualization of the study, aided in interpretation of the data, assisted in obtaining the additional data for the revised manuscript, and drafted the initial manuscript; Dr Stephany contributed to the conceptualization of the study, aided in interpretation of the data, and critically reviewed and revised the manuscript; Ms Porada contributed to the conceptualization of the study, aided in interpretation of the data, and critically reviewed and revised the manuscript; Dr McFadden conceptualized and designed the study, collected data for the initial manuscript and the revised manuscript, performed the statistical analysis for the initial manuscript and the revised manuscript, and critically reviewed and revised the manuscript; and all authors approved the final revised manuscript as submitted.

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Adolescence is a time of intense biological changes as well as dramatic mental and behavioral changes. Psychiatric disease continues to be an increasingly pervasive struggle for adolescents. Psychiatric diseases occurring in adulthood are often first manifested in adolescence, with 50% of all lifetime mental illnesses presenting by age 14.<sup>1</sup> Data from the NHANES in 2010 demonstrated the heavy toll that mental illness exacts on adolescents' lives, revealing that 22% of all adolescents (ages 13–18 years old) have already had mental health diagnoses associated with severe impairment within their lifetime. Despite the prevalence of mental health diagnoses and efforts to decrease stigma from these diagnoses, still only 50% of youth with a mental health disorder receive any behavioral health treatment.<sup>2</sup>

The pediatric hospital setting has seen a concerning trend in hospitalizations related to psychiatric illness. In fact, the relative number of hospitalizations related to psychiatric diagnoses has outpaced the general trend of rising pediatric hospitalizations nationally.<sup>3</sup> From 2008 to 2015, the total number of hospitalizations for suicidal ideation (SI) and suicide attempt (SA) more than tripled, and the percentage of all pediatric hospitalizations for SI and SA doubled across 31 children's hospitals.<sup>4</sup> When these pediatric hospitalizations are further examined, the rate of hospitalization is 5 times higher for children with a psychiatric diagnosis compared with children with no psychiatric diagnosis.<sup>4</sup> According to the Poison Control Centers' National Database, there were >170 000 encounters of teenagers with drug exposures nationwide in the year 2017, with 107 000 of these encounters being intentional ingestions.<sup>5</sup> Hospitalization for primary mental health diagnoses are not only common but also costly, because aggregate hospitalization charges for primary mental health diagnoses far exceed other very common pediatric diagnoses.<sup>6</sup> Ingestions are an all-too-common form of self-harm in adolescents,<sup>7</sup> and suicide is the second leading cause of death in teenagers.<sup>8</sup> One-third of all teenagers who die by suicide have had self-harm events in

the preceding 3 months,<sup>9</sup> and after a nonfatal self-harm event, adolescents are much more likely to die by suicide, especially among economically disadvantaged adolescents.<sup>10</sup> Given these alarming statistics, ingestion hospitalizations represent an opportunity to not only ensure medical stability but also provide access to potentially life-saving therapies, both acutely and long-term.

Our previous published work revealed ingestion as top reason for hospitalization among all adolescents hospitalized on our hospital medicine service.<sup>11</sup> The substantial number of these hospitalizations gives our medical providers abundant opportunities to effect change in the lives of adolescents. However, to have such an impact, we must increase our understanding of this population and critically appraise our clinical practices surrounding ingestion hospitalizations given the current paucity of literature. In this study, we address this gap in the literature by characterizing this patient population, classifying the care and resources the patients received, and determining areas for improvement in the health care delivered.

## METHODS

### Study Design

Our study is a retrospective chart review of all hospitalized adolescents (age 12 years and older) discharged from the hospital medicine service at a freestanding children's hospital in the Midwest United States. Patients were identified by the discharge diagnoses of patients age 12 years and older discharged from the hospital medicine service from May 1, 2017, through April 30, 2018. Patients who had a discharge diagnosis that included the word "poisoning," "ingestion," or "intoxication" were included. This method of patient identification was validated through manual chart review of all adolescent patients discharged from hospital medicine service for a 5-month subset of the time frame. Hospital medicine and critical care are the only services that admit these patients at our institution.

Data collected included the following: age (by year), sex, insurance status, admission

and discharge dates, admission service (hospital medicine or critical care), and diagnoses. Additional factors collected from the medical record, if documented, were sexual history, sexually transmitted infection (STI) testing, pregnancy testing, primary care provider (PCP) follow-up, recent SI screening, reason for ingestion, and substance(s) ingested. Sexual history documentation was considered present if documented at any time during the hospital encounter, including in the emergency department, and by any provider, including a social worker. Pregnancy testing was considered present if performed either during the hospital encounter or during the 2 weeks previous on the basis of outside records available in an effort to incorporate outpatient workup for presenting symptoms. For SI screening, PCP records were analyzed, and SI screening was considered present if the PCP documented if the patient endorsed or denied SI during a HEADSSS (home environment, education and employment, activities with peers, drugs, sexuality, suicide/depression, and safety) assessment or used a standardized screening such as the Patient Health Questionnaire-9 (PHQ-9). Although neither of these assessments are validated tools for suicide screening, they are the most-commonly used methods to assess for suicidality within our studied adolescent population. If the same patient was hospitalized more than once during the study period, each hospital encounter was considered separately. The local institutional review board reviewed this project and determined it exempt from full institutional review board review.

### Data Analysis

Descriptive statistics are reported, and  $\chi^2$  tests were used to assess for associations between patient, ingestion, and encounter characteristics, with an  $\alpha$  of .05 considered significant.

## RESULTS

### Patient Characteristics

From May 1, 2017, through April 30, 2018, 764 patients age 12 years old and older were discharged from hospital medicine. Of those encounters, 155 (20%) were ingestion

hospital encounters and were included in this analysis. Patient characteristics are outlined in Table 1. The majority of encounters (112, 72%) were female patients. The mean patient age was 15.5 years old. Five patients had multiple encounters, with 2 patients having 3 ingestion encounters and 3 patients having 2 ingestion encounters during the 1-year study period.

### Ingestion Characteristics

As detailed in Table 2, of the 155 patients hospitalized, 79% stated their reason for ingestion was an SA; 11% reported their intention was to “get high,” relieve pain, or “try to sleep”; and 10% denied that their intention was suicide but gave no clear reason for the ingestion. A majority, 57%, of encounters had ingested a single substance. Of the substances ingested, 32% were exclusively over-the-counter (OTC) medications, and 45% were exclusively prescription medications. Other substances ingested included alcohol, illicit drugs, and unknown substances. The prescription medications ingested were predominantly the patient’s own medications (34%), medication of a relative in the household (17%), or both (4%).

Analysis of the 123 SA ingestions revealed that a sizable proportion ingested either prescription medications (64%) or OTC medications (45%). Patients with SA ingestions were significantly more likely to have a history of previous SA ( $P = .01$ ).

Among patient-endorsed SA hospitalizations, 53% (65) of patients had no known previous history of SAs, 38% (47) of patients were seen for a previous SA, and 9% (11) of patients reported a previous SA for which they did not seek medical attention. In comparison, in hospitalizations in which the patient gave a different reason for the ingestion, 88% (15) had no known previous history of SAs, and 12% (2) were seen by a medical provider for a previous SA.

Of the 155 encounters included in this analysis, 124 had PCP records available within our electronic health record (EHR), thus allowing for more in-depth analysis (Fig 1). Of the 124 encounters with PCP records in our EHR, 25% did not see their PCP in the year previous. Of the 93 encounters with PCP visits in the previous year, 54% had documented SI screening. In 21 encounters (23% of encounters with PCP visit in the previous year), patients were seen by their PCP for a routine visit but did not have SI screening documented.

Ninety-six SA encounters had PCP records available within our EHR. Of these encounters, 22% did not have a PCP visit in the year before hospitalization. Of the 75 SA encounters with a PCP visit in the previous year, 56% had SI screening by their PCP, whereas 44% had a PCP visit, either for a routine visit (20%) or other reason (24%), but did not have SI screening documented. Of the 11 encounters in which patients had previously unreported previous SAs,

3 patients had no PCP visit over the last year, 5 had seen their PCP but no SI screening was documented, and 3 did not have PCP records in our EHR.

Sexual history was not documented in 29% of encounters. Of patients with sexual history documented, 52% endorsed current or past sexual activity. Only 19% of patients underwent STI testing, and 11% of the female patients did not have a pregnancy test during the encounter or in the 2 weeks previous. The majority of patients, 70%, were transferred to a psychiatric facility at discharge. Of the 108 patients transferred to a psychiatric facility, 104 gave SA as reason for ingestion, 2 gave a different reason, and 2 did not give a reason for ingestion. Of the 123 SA ingestions, 85% were transferred to a psychiatric facility (Table 2).

### Encounter Characteristics

As described in Table 3, 19% of the total patient encounters were initially admitted to critical care. Admission to critical care was not correlated with a particular reason given for ingestion, an OTC medication being ingested, or a prescription medication being ingested (Table 3). The mean length of stay at our facility was 1.5 days (SD: 1.2), with a range of <1 to 8 days. Encounters initially admitted to critical care were significantly more likely to have longer length of stay compared with encounters admitted to hospital medicine (2.7 days compared with 1.2 days,  $P < .01$ ). Length of stay was not associated with reason given for ingestion, type of medication ingested (OTC versus prescription medication), or psychiatric facility placement at discharge (Table 3). Encounters with sexual history documentation had significantly shorter length of stay compared with encounters lacking sexual history documentation. Critical care admission was associated with sexual history not being documented, and the association between length of stay and documented sexual history lost statistical significance when critical care admissions were excluded from analysis (1.2 days compared with 1.5 days,  $P = .16$ ). Of the 124 encounters with their PCP in our EHR, only 34% followed-up with their PCP within 2 months after their hospitalization.

**TABLE 1** Patient Characteristics ( $n = 155$ )

Variables	Number	Percentage of Total Ingestion Encounters, %
Sex		
Female	112	72
Male	43	28
Age, mean (SD), y	15.5 (15)	—
Range, y	12–18	—
Language		
English	152	98
Spanish	3	2
Insurance status		
Private	69	45
Public	85	55

—, not applicable.

**TABLE 2** Ingestion Hospitalization Characteristics (*n* = 155)

Variables	Number	Percentage of Total Ingestion Encounters, %
Reason given for ingestion		
SA	123	79
Get high, relieve pain, or try to sleep	17	11
No reason given	15	10
No. substances ingested		
Single substance	89	57
2 substances	33	21
3 or more substances	29	19
Types of substances ingested		
Exclusively OTC medications	50	32
Exclusively prescription medications	70	45
Both OTC and prescription medications	16	10
Exclusively alcohol	7	5
Exclusively illicit drugs	3	2
Alcohol and prescription medication	2	1
Alcohol, OTC, and prescription medications	1	1
Illicit drugs and prescription medications	1	1
Identity of substance undetermined	4	3
Source of prescription medications ingested		
Patient's own medication(s)	53	34
Relative's medication(s)	26	17
Friend's medication(s)	1	1
Both patient's own medication(s) and relative's medication(s)	6	4
Source undetermined	3	2
Placement upon presentation		
Acute care unit	125	81
ICU	30	19
Transferred to psychiatric facility at discharge	108	70
Sexual history documented during hospitalization		
Encounters in which teenagers endorsed sexual activity	57	52
Patients with STI testing	30	19
Female patients not tested for pregnancy <sup>a</sup>	17	11

<sup>a</sup> *n* = 112. The percentage of female patients who had reached menarche is unknown.

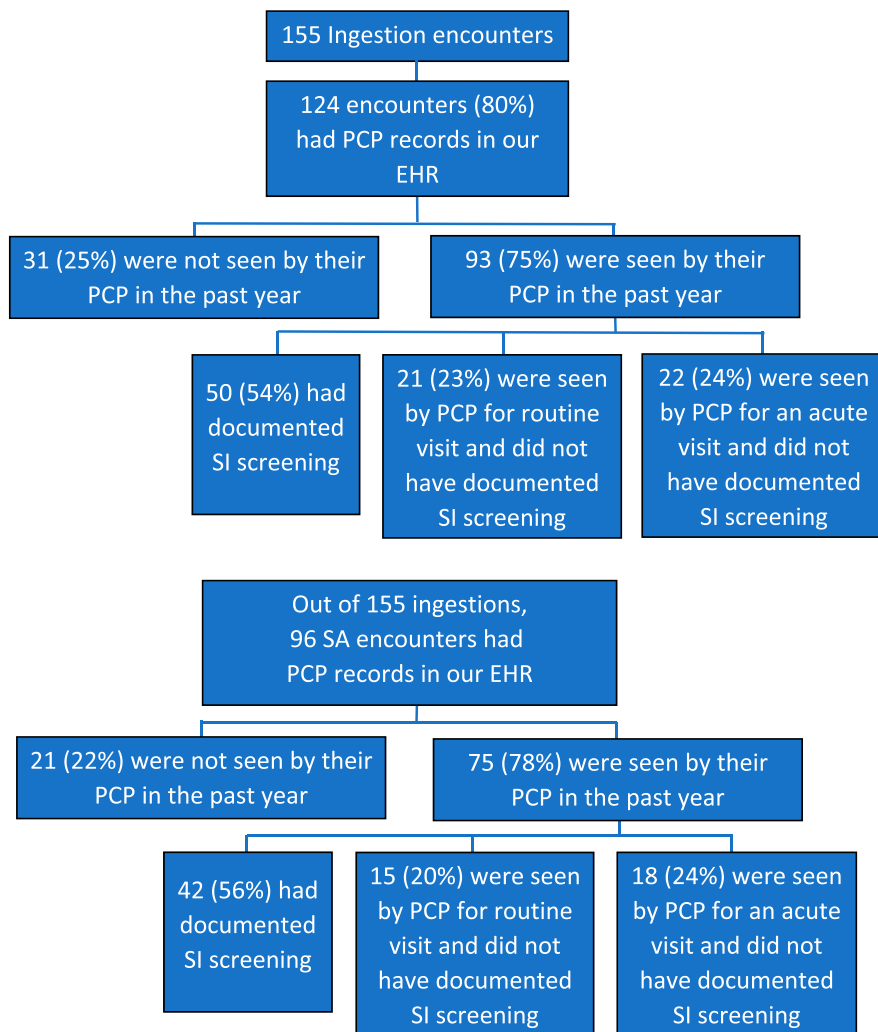
improve the care delivered to these patients.

Multiple institutions have implemented suicide screening in the emergency department<sup>12,13</sup>, however, far fewer have implemented routine screening of adolescents in the hospital setting.<sup>14,15</sup> In our patient population, a considerable portion of those who were seen by their PCPs in the previous year lacked documentation of SI screening. Although screening adolescents for suicidality in the primary care setting is not an explicit recommendation by the American Academy of Pediatrics (AAP), routine screening of all adolescents for depression with a formal self-report screening tool is a strong recommendation of both the AAP and the US Preventative Services Task Force.<sup>16,17</sup> Specific to the hospital setting, the Joint Commission on Accreditation of Healthcare Organizations 2019 patient safety goals for suicide prevention mandate this screening during hospitalization regardless of the reason for their hospitalization.<sup>18</sup> Endorsed by the AAP, the PHQ-9,<sup>19</sup> which includes SI screening questions as part of its self-reported assessment, is one of the most-commonly used tools for screening adolescents. Although the validity of the PHQ-9 has been called into question, with the false-negative rate estimated to be 19%,<sup>20</sup> our opinion is this imperfect screening test is superior to not screening, especially considering the value of intervention in those cases detected by screening. Although routine PCP visits would be an opportune time for this screening, given the lack of true medical home for many adolescents, we suggest applying the no-missed-opportunities paradigm to suicidality screening for hospitalized adolescents. Implementing universal HEADSSS assessment of hospitalized adolescents would likely increase detection of depressive symptoms and SI. Some methods to increase screening in nontraditional settings include EHR prompts for screening in admission notes and short electronic screening done on tablets with further investigation of positive screens. Every interface adolescents have with a medical provider can be an opportunity to provide preventive health services, and increased depression and SI

## DISCUSSION

In our study, we sought to characterize patients hospitalized for ingestion in the domains of intent, substance, and care to make recommendations for improvements in care. Corroborating the current bleak climate of mental health for adolescents described in epidemiological data,<sup>3</sup> ingestion was the most-frequent reason for hospitalization (20%) among adolescent patients at our institution. Our data revealed that most of our ingestion encounters were

endorsed SAs, and most of these patients ingested medications readily available to them: OTC medications and their own prescription psychiatric medications. In terms of care, we identified missed opportunities for screening and care coordination both in the hospital and primary care setting. As SI and SA hospitalizations continue to rise across the United States,<sup>3</sup> pediatric hospital providers should examine their practices for this patient population and identify areas to



**FIGURE 1** Documentation of SI screening before ingestion or suicide attempt.

screening, when paired with access to appropriate resources and health care, may even help prevent these hospitalizations.

Our findings regarding substances ingested act as a reminder that medical providers must counsel parents and guardians that while psychiatric medications can be life-saving and life-changing, they can still be abused like any prescription medication. Additionally, these findings suggest that caution should be advised when allowing teenagers access to not only prescription medications but also large amounts of OTC medications. Although many parents already recognize the danger of keeping prescription medications such as narcotics in the household, it may not occur to caregivers to limit access to OTC

medications, which can be equally lethal in large quantities. Although completely restricting access to OTC medications may not be feasible or necessary, providers can recommend that parents allow adolescents a limited supply for everyday needs. This recommendation would align with the suicide prevention strategy of lethal means counseling.<sup>21</sup> If adolescents and their families do receive lethal means counseling, it is usually provided by mental health providers, yet this important skill could be used by any provider caring for adolescents.

A considerable portion of our adolescents had no visit with their PCP in the year before hospitalization. Previous literature has shown that adolescents present infrequently for preventive health care

visits<sup>22</sup> and that, when they do receive care, they are underserved for their health counseling needs.<sup>23</sup> Lack of a medical home for adolescents means that parents and guardians may not receive counseling on safe storage of medications in the home by a trusted health care provider and that adolescents will be less likely to receive screening for mental health conditions and suicidality. Increasing compliance with well-child checks and encouraging SI screening when adolescents come to their PCP are both interventions that could improve identification of adolescents at risk for intentional self-harm. Hospitalists can facilitate PCP visit compliance by ensuring patients have PCP appointments scheduled before discharge, inquiring about barriers to attending PCP visits, and helping patients establish care with a PCP, if needed.

Screening for other high-risk behaviors during an ingestion hospitalization is another area in need of improvement. Although 74% of patients had a sexual history documented, our goal would be for all hospitalized adolescents to have a sexual history performed while in the hospital and documented in the EHR. Additionally, not all of the adolescent female patients hospitalized underwent pregnancy testing, despite the fact that half of the adolescents asked endorsed having had sex. Pregnancy is essential for pediatric providers to rule out before declaring medical stabilization and discharging the patient, not only for patients who present with ingestions but all female patients who have been sexually active and/or have reported high-risk behaviors. Screening for a variety of other high-risk behaviors during ingestion hospitalization may be effective because hospitalization is a time when adolescents are likely acutely concerned about their health, offering the advantage of “teachable moments” from hospital providers in addition to gathering information for follow-up care.<sup>24,25</sup>

In addition to the need for improved mental health and risk behavior screening, our analysis identified the need for improved follow-up after patients’ ingestion hospitalizations, whether with a PCP at an established medical home or with a mental

**TABLE 3** Characteristics Correlated to Critical Care Admissions and Length of Stay

Characteristics	Number Admitted to Critical Care	Percentage Admitted to Critical Care, %	<i>P</i>	Average LOS in Days (SD)	<i>P</i>
Reason given for ingestion			.401		.498
SA ( <i>n</i> = 123)	26	21	—	1.6 (1.3)	—
Get high, relieve pain, or try to sleep ( <i>n</i> = 17)	3	18	—	1.2 (0.6)	—
No reason given ( <i>n</i> = 15)	1	7	—	1.6 (1.1)	—
OTC medication ingested			.828		.943
Yes ( <i>n</i> = 69)	13	19	—	1.5 (1.3)	—
No ( <i>n</i> = 84)	17	20	—	1.5 (1.1)	—
Prescription medication ingested			.288		.620
Yes ( <i>n</i> = 89)	19	21	—	1.6 (1.2)	—
No ( <i>n</i> = 62)	9	15	—	1.5 (1.2)	—
Transferred to psychiatric facility at discharge			.966		.904
Yes ( <i>n</i> = 108)	21	19	—	1.5 (1.3)	—
No ( <i>n</i> = 47)	9	19	—	1.6 (1.1)	—
Sexual history documented during hospitalization			<.01		<.01
Yes ( <i>n</i> = 110)	8	7	—	1.3 (1.2)	—
No ( <i>n</i> = 45)	22	49	—	2.0 (1.2)	—

LOS, length of stay. —, not applicable.

health care provider. Improved follow-up with an established and trusted provider may be beneficial in preventing future high-risk behaviors and therefore future hospitalizations. Eighty-five percent of our patients were discharged to a behavioral health facility after medical stabilization, yet the majority did not follow-up with a PCP within 2 months. These results are comparable to our previously published work, which demonstrated that only 40% of adolescents followed-up with their PCP within 1 month of their hospitalization.<sup>11</sup> Although the full extent of the relationship between hospitalizations for SAs and behavioral health facilities and the different but equally important interventions they provide is out of the scope of this current article, further research on this topic would be useful to improve follow-up care and ensure continued screening and treatment by nonhospital medical providers.

Limitations of the current study include the reliance on provider documentation in the medical record, which may not accurately depict all aspects of services discussed, offered, or provided to adolescents. Furthermore, the study population was from a single tertiary care site and thus may not be generalizable to adolescents hospitalized in

other settings, particularly in rural hospitals or in nonfreestanding children's hospitals.

Our findings highlight numerous opportunities for improving the medical care of the adolescent hospitalized for an ingestion. From a hospital setting, optimizing the health care delivered to these adolescents encompasses many different areas of counseling, screening, and targeted interventions, including screening for suicidality and mood disorders, screening for high-risk behaviors, counseling on safe storage of medications in the home, and coordinating or establishing PCP follow-up. By applying the no-missed-opportunities paradigm to hospitalizations and taking advantage of these interactions to perform routine preventive health screening, hospitalists can mitigate the inadequacy of medical services received by adolescents that stems from their need of a medical home. Although hospitalizations could never replace the medical home established at a PCP, hospitalizations could represent a safe space to intervene, heal, and allow teenagers to get back on track as they make their way through the challenging years of adolescence.

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