

Research Brief

Medication Safety Counseling Practices of Pediatric Primary Care Clinicians

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Medication exposures and poisonings are a major cause of pediatric morbidity and mortality. Unsafe patient practices are well documented despite the American Academy of Pediatrics recommending that pediatric primary care clinicians discuss medication safety with patients. Current clinician counseling practices for pediatric patients are unknown. Studies of adult patients suggest that physician counseling practices often focus on administration but not storage or disposal. To address this gap, we administered a web-based survey to clinically active pediatric primary care clinicians in two mid-Atlantic health care systems. Survey content focused on characteristics of medication safety counseling practices by age group, including safe medication storage, administration, and disposal. Of 151 clinicians emailed, 40 (26.5%) responded. The majority were physicians (93.5%), female (87.1%), and completed residency/clinical training in pediatrics >15 years ago (58.1%). Most (82.5%) reported having >1 pediatric patient (aged < 19 years) in their practice who experienced an unintentional or intentional medication exposure or poisoning event. Reported practices for medication safety counseling often varied by patient age but safe disposal was rarely addressed for any age group. Respondents generally felt less knowledgeable and less comfortable with providing counseling on safe disposal in comparison to

safe storage and safe administration. Nearly all respondents (97%) would like to provide more counseling about medication safety, and the majority (81.3%) wanted additional educational resources. In this survey, we identified several modifiable deficits in pediatric medical counseling practices and a need for additional clinician training and resources, most notably in the content area of safe disposal.

Keywords: medication safety; medication counseling; pediatrics; medication storage; medication administration; medication disposal

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Medication exposures and poisonings from both prescription and over-the-counter (OTC) medications are a major cause of pediatric morbidity and mortality (Gummin et al., 2022; Lovegrove et al., 2023). In the pediatric population, young children and adolescents are most likely to experience an exposure/poisoning event (Gummin et al., 2022). Nearly 50,000 children less than 6 years old are evaluated in U.S. emergency departments annually for unsupervised medication exposures (Lovegrove et al., 2023). Among adolescents, exposures associated with self-harm and intentional misuse of medications have raised significant concern (King et al., 2018).

Although safe storage and disposal of medications are recognized as key poisoning prevention practices to reduce serious poisonings (Kendrick et al., 2017), unsafe patient household practices remain well documented (Frattaroli et al., 2017; Kennedy-Hendricks et al., 2016; McDonald et al., 2017). One study of homes with children in Baltimore City reported that only 3% ($n = 176$) had their prescription medications stored in a locked location (Frattaroli et al., 2017). Moreover, the rate of self-reported safe disposal is similarly poor (Kennedy-Hendricks et al., 2016).

Through Bright Futures Health Supervision Guidelines, the American Academy of Pediatrics (AAP) recommends that pediatric primary care clinicians discuss medication safety with caregivers and patients (Hagan et al., 2017). However, to our knowledge, pediatric primary care clinician counseling practices, with respect to medication exposure and poison prevention, are unknown. One study of adult patient populations suggests that physician counseling practices in the outpatient setting focus on administration, but not storage or disposal, when new medications are prescribed (Tarn et al., 2006). Prior work has shown that the prevalence of injury prevention counseling is low, but when provided it can be effective and is associated with safer behaviors and practices (Zonfrillo et al., 2018).

► AIMS

The aim of the study was to describe medication safety counseling practices, including safe medication storage, administration, and disposal in a sample of pediatric primary care clinicians.

► METHOD

In this cross-sectional study, we administered a web-based survey to clinically active pediatric primary care clinicians in parallel within two different mid-Atlantic health care systems, an academic health care system and a private integrated health care system. Study data

were collected and managed using REDCap (Research Electronic Data Capture). REDCap is a secure, web-based software platform designed to support data collection for translational and clinical health research. Invitations to participate were sent by email, and the survey was accessible between December 8, 2021, and December 22, 2021, for one health care system and between February 7, 2022, and February 24, 2022, for the other health care system; an interval reminder was provided at the midpoint of availability.

The instrument was developed de novo as no survey existed that captured all aspects of medication safety that were of interest; survey development was informed by existing literature and guidance as well as clinician experience. Face and content validity, along with instrument functionality, were reviewed by members of the study team and the draft instrument was tested by five practicing physicians. Survey content focused on characteristics of medication safety counseling practices by patient age group, including safe medication storage (i.e., how to store medications so they are not accessible for unintentional or intentional misuse), medication administration (i.e., how to use or take safe and appropriate doses of medication), and medication disposal (i.e., how to properly discard unused or expired medications). Survey content also queried clinician beliefs and experiences, including those related to medication exposures (i.e., misuse of a medication regardless of toxicity or clinical manifestation) and poisoning events (i.e., misuse of a medication that results in an adverse health reaction). Descriptive statistics were used to summarize the characteristics of the clinicians and the use and characteristics of medication safety counseling practices, beliefs, and experiences. Data were collected independently and were subsequently aggregated for reporting purposes across the two participating health systems. Approval was obtained separately from the Institutional Review Board at each of the participating health care systems for the parallel survey data collection activities.

► RESULTS

Characteristics of the Survey Respondents

Of 151 clinicians emailed, 26.5% participated ($n = 40$). Of these participants, 31 provided demographic and clinician role/training information at the end of the survey. For the other questions, the total of responses varied from 31 to 40 due to item nonresponse. Characteristics of the survey respondents who provided demographic and clinician role/training information are summarized in Table 1. The majority were physicians (93.5%), female (87.1%), and completed residency/clinical training in

TABLE 1
Characteristics of the Survey Respondents

<i>Characteristic</i>	<i>N (Proportion)</i>
Demographic characteristics	<i>N</i> = 31
Age	
<30 years	1 (3.2%)
30–39 years	5 (16.1%)
40–49 years	10 (32.3%)
50–59 years	12 (38.7%)
≥60 years	3 (9.7%)
Gender	
Female	27 (87.1%)
Male	4 (12.9%)
Race ^a	
Asian	4 (12.9%)
Black or African American	6 (19.4%)
White	20 (64.5%)
Other	1 (3.2%)
I prefer not to answer	2 (6.5%)
Ethnicity	
Hispanic or Latino	3 (9.7%)
Not Hispanic or Latino	25 (80.6%)
I prefer not to answer	3 (9.7%)
Clinician role and training	<i>N</i> = 31
Role in clinical setting	
Physician	29 (93.5%)
Nurse practitioner	2 (6.5%)
Residency/training completed	
<5 years ago	2 (6.5%)
5–15 years ago	11 (35.5%)
>15 years ago	18 (58.1%)
Clinical experience	<i>N</i> = 33
Number of patients who had experienced a medication exposure or poisoning event	
1–2	5 (15.1%)
3–5	9 (27.3%)
6–9	4 (12.1%)
10 or more	15 (45.4%)
Ages of the patients involved ^a	
0–4 years	28 (84.8%)
5–9 years	15 (45.4%)
10–14 years	13 (39.4%)
15–19 years	22 (66.7%)
Not sure	2 (6.1%)

^aRespondent could select more than one response; percentages do not total 100%.

pediatrics >15 years ago (58.1%). Most (82.5%) reported having more than one pediatric patient (aged ≤19 years) in their practice who experienced an unintentional or intentional medication exposure or poisoning event; 45.4% had at least 10 such patients. Among those clinicians who reported patient exposures or poisonings, 81.8% reported patient events in their practice caused by OTC medications, 63.6% reported events caused by medications prescribed for the patient, and 72.7% reported events caused by medications prescribed for others in the home. In addition, 30% reported having a personal experience where a family member or friend/child of a friend (aged ≤19 years) experienced a medication exposure or poisoning event because they misused their own medication or ingested someone else's medication either intentionally or unintentionally.

Medication Safety Counseling Practices

Reported practices for medication safety counseling varied by patient age, visit type (i.e., well vs. acute/sick), and whether medications were prescribed at the visit (Figure 1). Safe medication storage was most frequently addressed in visits for the youngest age group (0–4 years) and was less frequently addressed with advancing age. Safe medication storage and administration were more frequently addressed during visits in which medications were prescribed. Safe disposal was rarely addressed for any age group or visit type.

When asked which medication types are generally included in their safety counseling, the majority included prescription medications for the patient (85%), OTC medications for the patient (72.5%), and prescription medications for others in the household (52.5%), whereas only 35% of respondents included OTC medications for others in the household.

For visits with adolescent patients (ages 10–19 years), the majority (88.2%) of clinicians reported providing medication safety counseling to both the patient and the parent/guardian while the remainder (11.8%) reported counseling only the parent/guardian. No clinicians reported counseling only the adolescent patient.

Factors That Influence Ability to Provide Medication Safety Counseling

The availability of time, training, and resources were identified as barriers to counseling and varied across the components of medication safety counseling (Figure 2). A minority of respondents responded “strongly agree” or “agree” to having the time needed to provide counseling on safe storage, administration, or disposal (12.1%, 24.2%, and 9.1%, respectively). Nearly all respondents

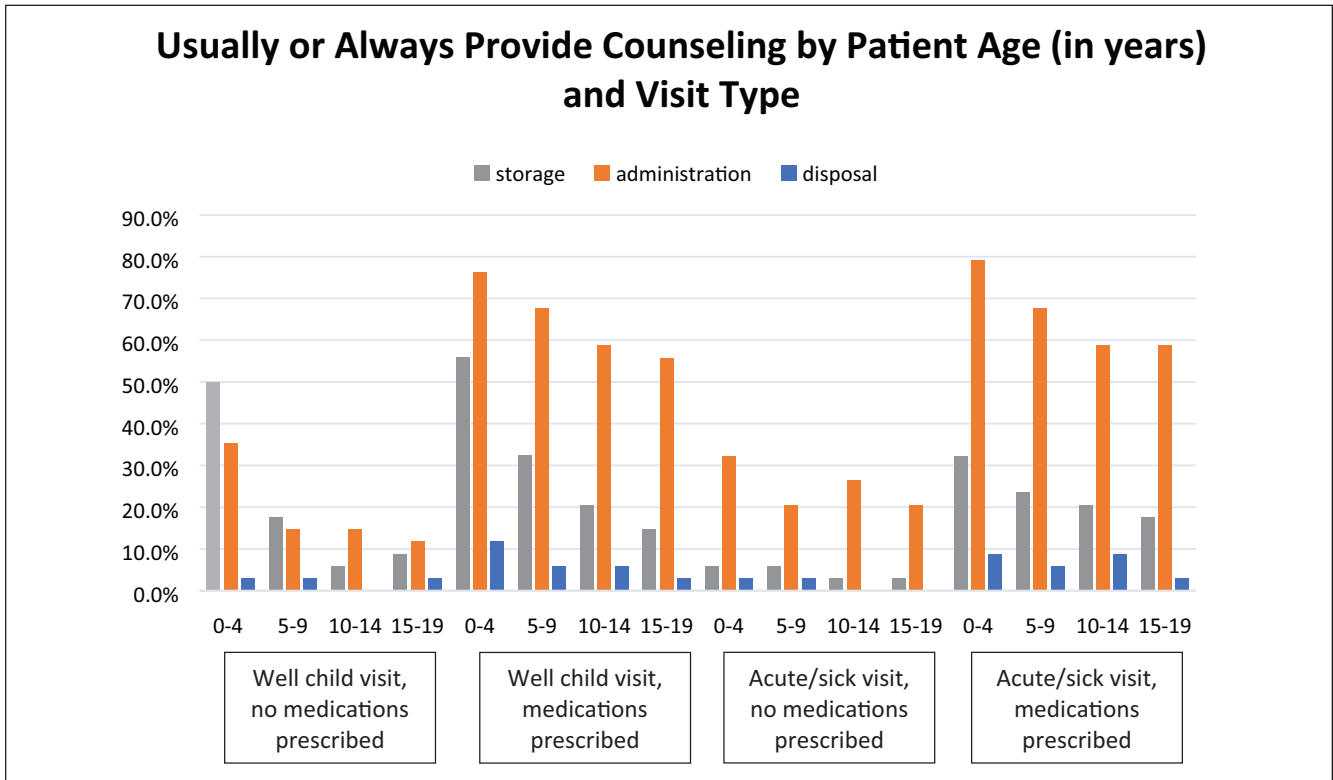


FIGURE 1 Medication Safety Counseling Practices

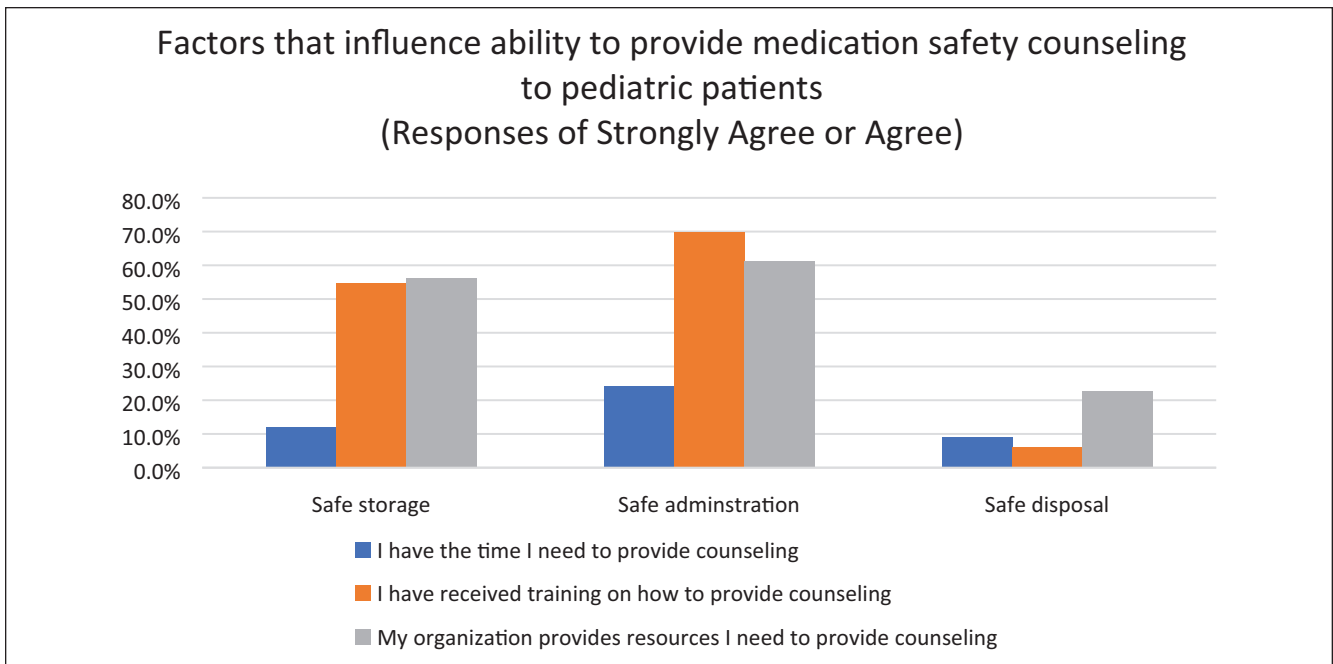


FIGURE 2 Factors That Influence Ability to Provide Medication Safety Counseling to Pediatric Patients

(97%) reported that they would like to provide more counseling about medication safety. More than half of the respondents strongly agreed or agreed that they received training on how to provide counseling on safe medication storage (54.6%) and administration (69.7%) and that their organization provided the resources needed to support counseling for safe storage (56.2%) and administration (61.3%). In contrast, few respondents strongly agreed or agreed that they received training (6.1%) or the provision of resources (22.6%) to support safe disposal counseling.

All respondents strongly agreed or agreed that medication exposures and poisonings are important pediatric causes of morbidity and mortality and that it is important for the primary care clinician to provide counseling on medication safety. Almost all respondents strongly agreed or agreed that they were knowledgeable about safe medication storage (90.9%) and administration (100%), and comfortable providing counseling on safe storage (97.0%) and administration (96.9%). When asked about safe disposal, however, far fewer respondents strongly agreed or agreed that they were knowledgeable (36.3%) or comfortable providing counseling (60.6%). The majority of respondents (81.3%) wanted additional educational resources to increase their own knowledge about medication safety, with 73.1% expressing interest in education on safe storage, 61.5% on safe administration, and 96.2% on safe disposal. Similarly, nearly all (90.3%) expressed interest in obtaining educational resources that could be shared with patients and their families to increase their knowledge about medication safety, with 85.7% expressing interest in education on safe storage, 78.6% on safe administration, and 100% on safe disposal.

► DISCUSSION

In this descriptive study, most clinicians reported having multiple patients in their practice who experienced a medication exposure or poisoning. Nearly a third of clinicians also reported having a personal experience where a family member or friend/child of a friend experienced a medication exposure or poisoning event. Given these clinical and personal experiences, it is not surprising that all respondents identified medication exposures or poisonings as important causes of pediatric mortality and morbidity and agreed that it was important for the clinician to provide medication safety counseling. These findings reflect the current epidemiology of pediatric medication exposures and poisoning, which have emerged as leading causes of morbidity and mortality in children and adolescents and may be increasing (Gummin et al., 2022; King et al., 2018;

Lovegrove et al., 2023; Radhakrishnan et al., 2022). The clinician responses are also consistent with the AAP recommendations that support the need for medication safety counseling (Hagan et al., 2017).

We also observed different trends in reported practices for medication safety counseling across two age groups (i.e., 0–4 years and 15–19 years). This finding presents an opportunity to improve clinical practice, as medication safety counseling was reported less frequently for the older age group (15–19 years) despite the ongoing, and potentially increasing, risk for exposure or poisoning in adolescents (Gummin et al., 2022). Future work may need to explore if, or how, counseling may need to be tailored to address the more prevalent concerns of self-harm and intentional misuse of medications in this adolescent population (King et al., 2018).

Overall, we identified opportunities to improve pediatric medication counseling practices and a need for additional clinician time, training, and resources, most notably in the content area of safe disposal. Safe disposal is a critical component of medication safety and medication safety counseling. Over-prescribing to pediatric patients is well described and leads to unused medications (Harbaugh et al., 2019). The potential risks for misuse from unused opioid medications are well known, as published studies regarding unused opioid medications have shown that most parents admit to keeping their children's unused opioids, and 6% to 20% of adults report sharing their children's or their own unused medications with family/friends (Clark et al., 2016). Although there are several sources of guidelines and resources to promote safe disposal of medications (Wu & Leong, 2020), our results suggest that this information may not be conveyed to patients as part of medication safety counseling in pediatric primary care. Future research should include the development and testing of a standardized, user-friendly evidence-based clinical tool or technique for use in pediatric primary care practices to support medication safety counseling that, in particular, focuses on the promotion of safe disposal given this observed gap.

Limitations of this study include a modest response rate, but it is comparable to published response rates for similar web-based surveys distributed to physicians by email (Cunningham et al., 2015). There is also potential for self-selection bias given the voluntary participation. Misunderstanding or misinterpretation of the survey questions are also a possibility although it was not identified in the development or pretesting process. Despite the potential limitations, our work provides insight into the medication safety counseling practices of pediatric primary care clinicians in two different health care systems and identifies several areas of improvement that

could be targeted with an intervention to enhance medication safety counseling.

► IMPLICATIONS FOR PRACTICE

Our survey identifies several modifiable deficits in pediatric medication counseling practices, most notably in the area of safe disposal. Given the prevalence of medication exposures and poisonings in the pediatric population, as well as reported by the responding clinicians in their own practices, further work is needed to support medication safety counseling in pediatric primary care. The lack of time, training, and resources identified by the respondents as barriers may be addressed by the development of a standardized, user-friendly evidence-based clinical tool or technique for use in the pediatric primary care practice setting.

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