A survey of caregiver perspectives on emergency epinephrine autoinjector sharing

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Clinical Implications

- Most caregivers would share their child's epinephrine autoinjector during an anaphylaxis emergency. Those who would probably not share right away expressed greater concerns about diagnostic uncertainty and potentially needing the epinephrine autoinjector for their own child.

TO THE EDITOR:

Anaphylaxis is a medical emergency that can occur in communities without warning,[1] and up to 5% of the US population has experienced anaphylaxis.[2] Intramuscular epinephrine is the first-line treatment for anaphylaxis and is effective and safe. While mild side effects may be noted with treatment, severe adverse events are infrequent. One multicenter registry reported that side effects such as tremors, palpitations, and anxiety occurred in 21.6% of treated subjects,[3] and in another study adverse cardiovascular complications occurred in 1.3% of intramuscular epinephrine doses.[4] However, in a report by Wood et al,[2] only 11% of subjects with anaphylaxis self-administered epinephrine and 52% of individuals had never received an epinephrine autoinjector prescription.[2] Because anaphylaxis is never expected or planned and at-risk individuals may not have prescribed epinephrine autoinjectors available,[5-8] circumstances may arise in which epinephrine sharing would be considered.

We performed a telephone survey around a hypothetical situation in which the respondent is having lunch with their family at an amusement park, when suddenly a person stands up and yells, "Does anyone have epinephrine?!! My child is having an allergic reaction and I don't have theirs here!"

The survey instrument was developed and validated with feedback from patients and practicing community and academic allergists. Caregivers were invited to participate if they had a child younger than 18 years who had an encounter registered with the Dartmouth-Hitchcock Children's Medical Center pediatric allergy clinic between October 1, 2016, and October 31, 2017, and an epinephrine autoinjector prescription reported in the hospital medical record system. Power calculations indicated that a sample size of 64 subjects would be required to detect a 30% difference in willingness to share between groups with high versus low epinephrine autoinjector costs (US dollars, power 0.8 with an alpha of 0.05). To meet this enrollment, a random number generator was used to select 278 subjects who were notified of the study. Using this sample, 77 subjects were enrolled (163 were unreachable, 38 declined). Stata 14 was used to perform data analysis with *t* tests of equal variance, chi-square test, and Fischer exact test (StataCorp LLC, College Station, Texas). This study was reviewed and approved by the Dartmouth College Committee for the Protection of Human Subjects.

Most subjects surveyed indicated willingness to share epinephrine right away with another individual for whom it was not prescribed during an emergency. As shown in Table I, 76.6% of subjects responded "I would share right away." Subjects willing to share immediately were compared with subjects who responded they would probably not share right away. When evaluating age and sex of child, sex of respondent, type of allergy, duration of allergy, perceived severity of allergy, prior anaphylaxis, type of autoinjector, number of autoinjectors, number of prior epinephrine autoinjector injections, annual household income, and level of education, no variable was identified that significantly discriminated between subjects who were willing to share right away and those who were not, although there was a trend for caregivers of male children to share immediately (84% with a male child would share right away vs 67% with a female child; $P = .07$).

Both subjects who were willing to share right away and those who were not willing to immediately share expressed concerns about sharing (Figure 1), with some significant differences identified between groups. Subjects who indicated they probably would not share right away expressed greater concerns about (1) harm if the situation was not truly an allergic reaction (88% vs 61% concerned; $P = .03$), (2) dosing uncertainty (82% vs 42% concerned; $P = .005$), (3) their child needing the device (82% vs 39%; $P = .002$), and (4) delay in refill (53% vs 20%; $P = .008$). While 59% of all subjects indicated concerns about liability in sharing and 34% expressed concern about autoinjector replacement cost, significant differences were not found between groups. Conversely, 95% of all subjects indicated they would be worried about harm if not sharing the device, also without significant differences between groups.

A minority of all subjects expressed concerns about epinephrine autoinjector expense, and 35% of subjects would not think twice about sharing even if replacement cost was $1000 or more (Table I). Notably, out-of-pocket costs of epinephrine for most patients were well below this threshold, with 73% of subjects spending $150 or less for all their autoinjectors in the previous year and 29% of subjects reporting no out-of-pocket autoinjector costs in the preceding year.

To our knowledge, this is the first survey of caregiver willingness to share epinephrine autoinjectors during an emergency. In light of increasing anaphylaxis rates and reluctance of some patients to carry epinephrine with them at all times,[5-8] this may represent an important finding in some circumstances. In one study, less than half of patients with a history of food allergies presenting to the emergency department or urgent care center for food-related allergic reaction were carrying their epinephrine autoinjectors.[7] In another, only 40% of patients presenting for routine allergy clinic follow-up had an autoinjector at the time of the visit.[8]

We found that 76.6% of caregivers would share their epinephrine autoinjector right away. Most caregivers worried about harm from epinephrine use if the situation was not an allergic reaction, possible harm from not sharing right away, liability, and dosing uncertainty, with less than half of all subjects surveyed worried about subsequently needing to use the device

TABLE I. Respondent and child characteristics and willingness to share epinephrine (n = 77)

Characteristic	n	Would probably not share right away (n = 18)	Would share right away (n = 59)	*P* Value
Age of child (y), mean ± SD		9.1 ± 5.7	7.4 ± 4.4	.2*
Sex of child				
Female	33	33%	67%	.07†
Male	44	16%	84%	
Respondent sex				
Female	65	25%	75%	.49‡
Male	11	18%	82%	
Annual household income				
<$50,000	13	31%	69%	.54‡
$50,000-$100,000	28	18%	82%	
>$100,000	31	16%	84%	
Highest level of respondent education				
High school or less	20	40%	60%	.12‡
Completed college	26	15%	85%	
Completed graduate school	30	17%	83%	
Indication for epinephrine autoinjector				
Food allergy	62	23%	77%	.73†
Stings, shots, hives, other	30	30%	70%	.27†
Duration of allergy (y), mean ± SD	5.0 ± 4.7		4.3 ± 3.6	0.5*
Perceived severity of allergy				
Mild	22	27%	73%	.84†
Moderate	29	21%	79%	
Severe	23	26%	74%	
History of anaphylaxis				
Yes	19	21%	79%	.78†
No	58	24%	76%	
Ever used epinephrine				
Yes	8	25%	75%	.6‡
No	69	23%	77%	
Type of device				
EpiPen type				0.67‡
Yes	69	23%	77%	
No	5	20%	80%	
Adrenaclick type				0.52‡
Yes	7	14%	86%	
No	66	23%	77%	
AUVI-Q type				0.41‡
Yes	2	50%	50%	
No	72	22%	78%	
How many devices does your child have that are not expired?				0.4‡
Two	32	31%	69%	
Four or more	39	18%	82%	
Other	5	20%	80%	
When would the replacement cost make you think twice about sharing?				
Would it make you think twice at…				.01‡
$20?	4	100%	0%	
$100?	15	27%	73%	
$500?	27	22%	78%	
$1000?	4	0%	100%	
This would not be a concern	27	15%	85%	
Quartile of annual out-of-pocket cost (all autoinjectors)				
1 ($0)	22	23%	77%	.91‡
2 ($10-$40)	14	14%	86%	
3 ($46-$150)	20	25%	75%	

(continued)

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