

Pre-hospital Provider Performance in an Anaphylaxis Simulation

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Background

- Anaphylaxis is poorly recognized in pre-hospital settings, particularly if the presentation does not include cutaneous findings of urticaria or angioedema (atypical anaphylaxis).¹
- Retrospective studies reveal only 19-54% of qualifying cases received epinephrine in the field.^{2,3}

Methods

- A simulation scenario focusing on atypical anaphylaxis was provided to a large metropolitan emergency medical services (EMS) agency.
 - 2-year-old with a known nut allergy.
 - Parent called EMS from a party following rapid onset of emesis with unknown ingestion.
 - Wheezing was present on initial exam.
 - If the crew did not treat anaphylaxis by 3 minutes, the patient then developed change in behavior and hypotension.
- Debriefing followed which focused on reviewing diagnostic criteria, use of IM epinephrine use as initial treatment, epinephrine dosing, and demonstration of epinephrine auto-injector (EAI) use.

Organizational Structure of the EMS Agency

- EMS agency has 34 stations divided into 7 battalions.
- Each station has at least 1 Engine and 1 Medic crew every shift.
- Each Engine and Medic have a least 1 paramedic at all times.
- All members of the crew hold a valid EMT card and are BLS trained.

Simulation Sessions (SIMS)

- SIMS were run by 1 physician and 1 simulation coordinator at 4 stations in different battalions each half day for 2 subsequent days.
- One crew at a time was called out of service from the battalion every 20 minutes for SIMS.

Acknowledgements

- This study was funded by HRSA U03MC28844-01-00 and was supported by The Clinical and Translational Intramural Funding Program through the Abigail Wexner Research Institute at Nationwide Children's Hospital (Columbus, Ohio)



Results

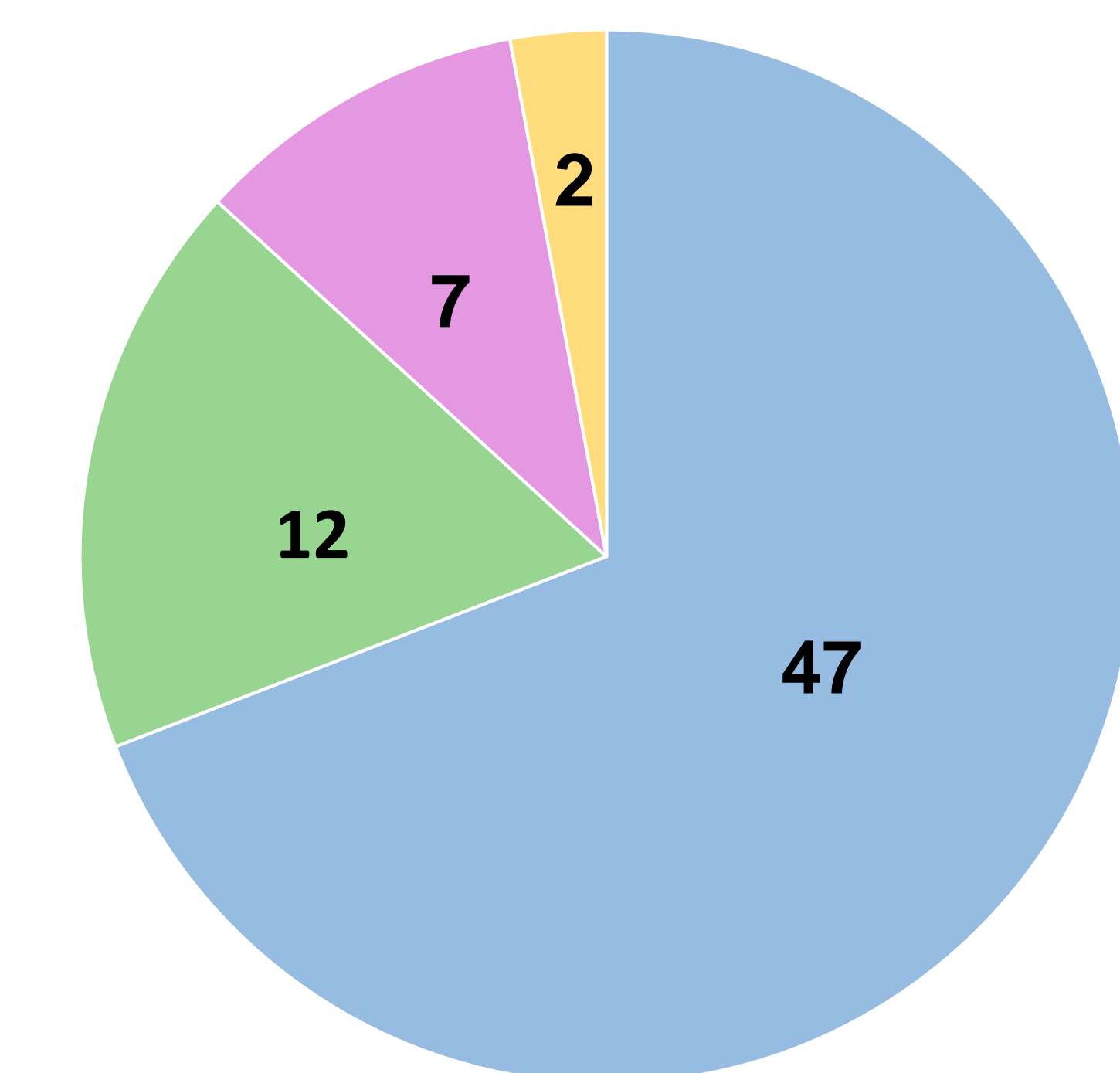
- 507 providers completed the simulation in 68 separate interactions.
- A diagnosis of anaphylaxis was made in 21 (31%) of SIMS.
- Mean time to decide to give epinephrine was 3:21 minutes.
- Mean time to administration of epinephrine was 4:22 minutes.
- In 54 SIMS (79%) the crew asked for the patient's epinephrine auto-injector.
- Two SIMS gave epinephrine subcutaneously, none gave medication intraosseous or intravenously.
- Five SIMS gave epinephrine in a location other than the lateral thigh.

Table 1: Simulation Performance Assessment

Simulation Performance Variable	Results	N (%)
Epinephrine: Initial Therapy	Yes	45 (66%)
	No	23 (34%)
	NA (used auto-injector)	46 (68%)
Epinephrine: Dose Correct	Yes	13 (19%)
	No	5 (7%)
	Missing	4 (6%)
Epinephrine: Correct Site of Administration	Yes	58 (85%)
	No	6 (9%)
	Missing	4 (6%)
Medication Double Check	Yes	27 (40%)
	No	27 (40%)
	Missing	14 (20%)
Correct Medication Administration Technique	No	28 (41%)
	Yes	36 (53%)
	Missing	4 (6%)

Missing data was not recorded during the simulation session

Figure 1: Resource Used to Determine Dose



■ Home Epi Auto-Injector ■ Age Estimate ■ Broselow Tape ■ Missing

Discussion

- While EMS members gave epinephrine in a majority of SIMS, one-third did not treat with epinephrine as initial therapy.
- A majority administered the epinephrine in the correct location, but errors were noted in administration technique for both EAI and drawn-up epinephrine doses.

Limitations

- SIMS were not offered to all EMS members during the sessions.
- Some simulations were offered to more than one crew at the same time due to time constraints.
- Not all data points had complete documentation.

References

1. Jacobsen et al. Anaphylaxis Knowledge Among Paramedics: Results of a National Survey. Prehospital Emergency Care 2012; 16: 527-534
2. Manivannan et al. Epinephrine use and outcomes in anaphylaxis patients transported by emergency medical services. Am J Emerg Med. 2014 Sep; 32(9): 1097-102
3. Chung et al. Pre-hospital management of anaphylaxis in one Canadian Urban Centre. Resuscitation. 2014 Aug (8): 1077-1082