Preventing Medication Errors in EMS

2008 - 2015

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Phoenix, Arizona

- Population 1.5 million (6th largest in USA)
- 520 square miles (364 days of sunshine)
- 70 ALS Engines (2 PMs/2 EMTs)
- 30 ALS Rescues/Ambulances (1 PM/1EMT)
- 14 BLS Ladders (4 EMTs)
- 693 Paramedics
- 995 EMTs

Phoenix Fire Dept. 2015 Responses

- ALS 89,196
- BLS 63,887
- Fire 13,178
- Sp/OPS 1,526
- Other 5,637
- Total 173,234

Phoenix Fire (EMS) Dept. 2015 Responses

- Total EMS Responses 153,083 (88%)
- Total EMS Transports 57,312 (37%)

5 RIGHTS

Right patient
Right medication
Right dose
Right indication
Right route
(Right documentation)

Medication Error

- Defined as any preventable error involving medication that may cause injury or harm to the patient.
- Wrong medication, wrong dose etc.

Reported Errors (annual survey)

2008	2009	2010	2011	2012	2013	2014
10%	4.6%	5%	4.8%	3%	2%	2%

2015

3%

2015

- The good news is that all 7 reported errors involved wrong drug dosages.
- There were no errors involving the wrong medication (Epi. v. MS or vice versa).
- Pediatric dosing errors decreased from 60% to 28% of the reported errors.
- None of the pediatric errors involved Epi.

2015

Pediatric EMS incidents were about 8% of EMS calls (153,000 v 13,000 in 2015). Yet pediatric medication errors occur at a much higher rate than with adult patients, even though a very small number (<5%) of pediatric patients received medications.

Medication Dosing Errors in Pediatric Patients Treated by Emergency Medical Services

JD Hoyle et al. Prehosp.Emerg.Care 2012;16:59-66

Pediatric Dosing Errors

- Study of 8 EMS agencies in Michigan
- 5,547 children < 12 treated by paramedics
- 230 (4.1%) received medications and had a documented weight or BLT color.
- 360 medications were given (multiple medications in 73 cases).
- Medication error defined as > 20% deviation from the weight-appropriate dose (reported weight or BLT use).

Pediatric Dosing Errors

- Medication dosing errors occurred in 125 of 360 drug administrations. (34.7%)
- Epinephrine had the highest percentage of incorrect doses.

JD Hoyle et al. Medication Errors in Pediatric Patients Treated by EMS. PEC 2012;16:59-66

Study Limitations

- Hospital records were not reviewed.
- No determination of patient harm was made.
- Some medication errors were not likely to be clinically significant.
- No determination was made on why the errors occurred.

Conclusions

- Medications delivered to children in the prehospital setting by paramedics were frequently outside the proper range when compared to documented patient weights.
- EMS systems should develop strategies to reduce pediatric medication dosing errors.

Root Causes of Errors In Pediatric Patients

- Underlying causes of dosing errors were found in four areas (cognitive, procedural, affective, and teamwork).
- The error rate for diazepam dosing was 47%; for midazolam it was 60%.

Richard Lammers et al. Root Causes of Errors in a Simulated Prehospital Pediatric Emergency. Acad Emerg Med. 2012;19:37-47

Root Causes of Errors In Pediatric Patients

- Incorrect estimates of weight
- Incorrect use of the Broselow-Luten tape
- Faulty recollection of doses
- Difficulty with mental calculations (stress)
- mg/kg to ml conversion errors
- Inaccurate measurement of volumes
- Failure to crosscheck doses with partners

PEDS CODE CARD

Phoenix Fire Department
PEDS CARD

AGE	WT(KG)	ET TUBE	DEFIB (2J/KG)	EPI DOSE (ML)1:10,000
Newborn	3.0	3.5	6	0.35 ml
6 mo.	7.0	3.5	14	0.7 ml
1 yr.	10	4.0	20	1.0 ml
2 yr.	12	4.5	24	1.3 ml
3 yr.	15	4.5	30	1.5 ml
4 yr.	17	5.0	34	1.7 ml
5 yr.	20	5.0	40	2.0 ml
6 yr.	22	5.5	44	2.2 ml
7 yr.	25	6.0	50	2.5 ml
8 yr.	28	6.0	56	2.8 ml
9 yr.	30	6.5	60	3.0 ml
10 yr.	33	6.5	66	3.3 ml
11 yr.	45	6.5	90	4.5 ml
12 yr.	50	7.0	100	5.0 ml

2015

- 3 Ketamine (under) dosing errors – 2mg/kg IM instead of 4mg/kg IM.
- Ketamine was added to our paramedic drug box in November 2015.
- Ketamine on-line CE is available for 1 hr. credit. Ketamine ppt is being repeated at our CE meetings for the next 3 months.

5 points to remember!

- Always double check the drug/dose.
- Put narcotics in separate container/tamper resistant plastic bags with serial numbers.
- There is no need to be in a hurry…to give a patient the wrong medication!
- For kids, use the BLT, a PEDS Code Card, or Handtevy ™ card or system.
- Mistaeks Happen! Report them appropriately.

Comments on last year's survey

- Always double check
- Slow down
- Most of the resources, references in place are excellent
- Communicate with partner and don't let BLS guys touch your stuff
- PFD CEs are F***ing pointless. If you want to prevent med. errors, the CEs need to train us…on protocols, standing orders etc.

Everyone makes mistakes…
my last mistake (that I know of)
happened on October 12, 2015.

October 2015 Lemke Expedition Grand Canyon

Upset Rapid

Colorado River

Upset Rapid (rated 8-10)

- According to the most recent river guide books, there is a left run and a right run
- The center run is “NOT RECOMMENDED!”

Upset Rapid

Thanks to Dr. Tim Wolfe and his wife Susan...

- Tim: for saving my ass and pulling me out of 50 degree water (in < 60 seconds).
- Susan: for trying to and who ended up "taking the plunge" with me.

References

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The End

Questions?

Google: DR Party Expedition Grand Canyon Highlights 2013
(you-tube 10 min video)