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Variability in emergency department electronic medical record default opioid quantities: A national survey

While opioid prescribing for acute pain in U.S. emergency departments (EDs) is more consistent with recommendations for a 3-day or less supply than in other settings, the average number of tablets prescribed still remains highly variable [1-3]. Furthermore, larger initial prescriptions are associated with prolonged opioid use and potential for misuse [2,3]. Setting default tablet order amounts lower than the baseline average (e.g. 10 tablets) reduces the tablet number prescribed [4]. Conversely, if set too high (e.g. 20 tablets), prescribers are nudged into prescribing more than they would have without a default [5]. It is unknown whether EDs have default orders for opioid amounts and whether these defaults are consistent with the recommended 3-day supply (typically ≤12 tablets) [6]. Thus, we conducted a national survey of U.S. EDs to determine the presence and size of default opioid tablet amounts.

We surveyed the American College of Emergency Physicians Emergency Medicine Practice Research Network (EMPRN), a volunteer national survey panel of 893 emergency physicians nationwide. Outcomes included 1) the default number of tablets for the two most commonly prescribed opioids, hydrocodone/acetaminophen (5–325 mg and oxycodone/acetaminophen (5–325 mg), 2) whether the ED had a default tablet number for each and 3) whether these defaults were for ≤12 tablets. Additional data collected included: the ZIP code of respondents' ED mapped to U.S. state and whether a law was enacted at the time limiting opioid prescription amounts according to data obtained from the National Conference of State Legislatures. Chi-square tests were used to determine differences in having an opioid default or tablet number within guidelines between US region and state laws.

Of the 893 members surveyed, 299 (33%) from 47 states responded (Table 1). Defaults were present in 161 (54%) EDs. There was significant variation in default tablet amounts (Fig. 1). The median default tablet number for both hydrocodone and oxycodone was 15 (IQR 12–20) with 22.3% and 25.0% being for ≤12 tablets, respectively. Of EDs with defaults, 15 (10%) reported ≥30 tabs (range 30–90 tablets). Northeast region EDs had the largest proportion of defaults for ≤12 tablets (38.6%) versus no default (43.9%) or >12 tablets (17.5%, p = 0.014). EDs with default quantities <12 tablets were more likely to be located in states with prescribing limits (50%) compared with those with no default (30%) or a default of >12 tablets (36%) (p = 0.023).

This study demonstrated wide variation in default opioid orders (from 1 to 90 tablets) with 42% having defaults >12 tablets among those with default quantities. Given the tendency for prescribers to use default opioid amounts, it appears that a significant proportion of existing EMR defaults may actually encourage higher prescribing than if these EDs had no defaults or if the defaults were lower. We found that guideline concordant EMR defaults were more common in states with opioid prescribing limits, suggesting that state policies may encourage compliance. This study is limited by a suboptimal response rate and limited data describing the characteristics of EDs. As a result, it is unclear whether these findings are representative of EDs nationally. In summary, our findings indicate that there is significant opportunity to change ED EMR opioid defaults to be concordant with existing national and state guidelines.

Table 1
Emergency department (ED) default opioid tablet order quantities by location of ED and presence of state policy limiting prescribing.

Category	N	%	No Default		Default ≤12 tabs		Default >12 tabs		p-value
			N	%	N	%	N	%	
All	299		138	46.2	68	22.7	93	31.1	
US census region									0.014
Northeast	57	19.1	25	43.9	22	38.6	10	17.5	
New England	16		8	50.0	3	18.8	5	31.3	
Mid-Atlantic	41		17	41.5	19	46.3	5	12.2	
Midwest	79	26.5	41	51.9	10	12.7	28	35.4	
E-N Central	54		32	59.3	4	7.4	18	33.3	
W-N Central	25		9	36.0	6	24.0	10	40.0	
South	84	28.2	34	40.5	21	25.0	29	34.5	
South Atlantic	47		17	36.2	12	25.5	18	38.3	
E-S Central	11		4	36.4	4	36.4	3	27.3	
W-S Central	26		13	50.0	5	19.2	8	30.8	
West	78	26.2	38	48.7	15	19.2	25	32.1	
Mountain	25		11	44.0	5	20.0	9	36.0	
Pacific	53		27	50.9	10	18.9	16	30.2	
State legislation									0.023
Limits opioid prescribing	109	36.6	42	38.5	34	31.2	33	30.3	
No limits	189	63.4	96	50.8	34	18.0	59	31.2	

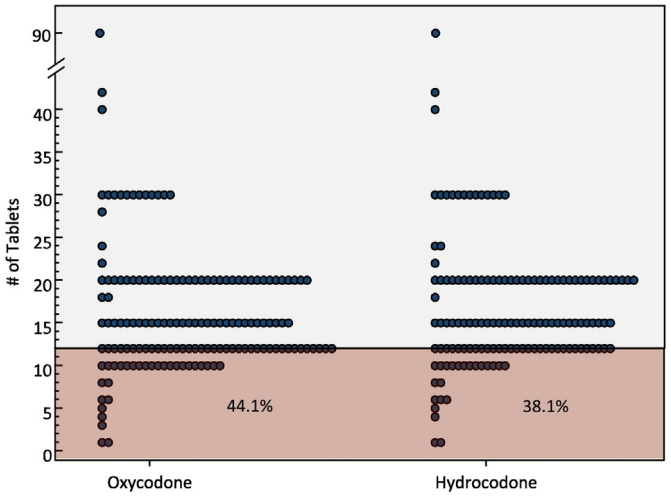

Fig. 1. Distribution of emergency department default opioid tablet order quantities among survey respondents and proportion for a standard 3-day supply (12 tablets) or less.

Declarations of interest

None.

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Frequency of emergency medicine resident dosing miscalculations treating pediatric patients

We conducted a review of 500 consecutive IV orders placed by emergency medicine [EM] residents during the calendar year 2018 in the Pediatric Emergency Medicine Department of Mount Sinai St. Luke's Medical Center in New York City. We are located in an urban setting with an approximate census of 20,000 pediatric patient visits/year. We sponsor an active 3-year EM residency program during which residents [n = 50] work clinical shifts in the pediatric ER under the direct supervision of board-certified pediatric emergency medicine attending physicians.

EM residents ordered a variety of IV medications [ketorolac, morphine sulfate, various antibiotics, famotidine, etomidate, ondansetron, metoclopramide, various steroid preparations, sedative medications, magnesium sulfate, diphenhydramine, ketamine, acyclovir, insulin, glucagon, lorazepam, D25W, IV fluids with potassium chloride supplement]. Calculations identified deviation from recommended dosing [1] of >10% with 105 orders [21%].

Some examples of deviant dosing included:

Patient weight	Condition	Medication and dosage ordered
66 kg	DKA	Insulin continuous infusion 3 units/h
90 kg	Status asthmaticus	Methylprednisolone 185 mg
16.4 kg	Herpetic infection	Acyclovir 820 mg
5 kg	Fever/young infant	Ampicillin 90 mg/cefotaxime 130 mg

A complete review of all cases revealed no instance of a clinically significant adverse outcome due to medication dosing.

Pediatric medication dosing miscalculation [under/over-dosing] can result in devastating consequences. There is little published data on the frequency of resident dosing errors in a pediatric care setting. One prior study [2] noted a relatively lower rate of 6% prescribing errors by pediatric residents working in a clinic. We know of no prior published report specifically documenting the prevalence of medication dosing errors by EM residents training in a pediatric emergency department [ED], a common scenario at academic medical institutions.

In general, the ED setting can predispose to relatively higher risk for medication errors [3,4]. Over-dosage is the most commonly documented medication error occurring in the pediatric emergency medicine population [5]. Prescriber error-rates in emergency medicine, even among attending level physicians, has been shown to occur twice as frequently for pediatric vs adult medication dosage calculations [6].

Multiple factors can contribute to increased risk for medication dosing errors. The fast paced and frequently chaotic ED environment can augment risk for miscalculations. There can be insufficient oversite, as it is often impractical for supervisory attending level physicians to review all resident medication orders prior to their administration. In addition, EM residents are relatively inexperienced with pediatric weight-based dosing calculations.