

Perception and Practice Among Emergency Medicine Health Care Providers Regarding Discharging Patients After Opioid Administration

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ABSTRACT

Purpose: This study aimed to determine the current attitudes, perceptions, and practices of emergency medicine providers and nurses (RNs) regarding the discharge of adult patients from the emergency department (ED) after administration of opioid analgesics.

Methods: A cross-sectional survey was administered at 3 hospital sites with a combined annual ED census of >180,000 visits per year. All 59 attending emergency physicians (EPs), 233 RNs, and 23 advanced practice clinicians (APCs) who worked at these sites were eligible to participate.

Findings: Thirty-five EPs (59.3%), 88 RNs (37.8%), and 14 APCs (60.9%) completed the survey for an overall response rate of 51.75%. Most respondents were female (95 [69.9%]). The factor ranked most important to consider when discharging a patient from the ED after administration of opioids was the patient's functional status and vital signs (median, 2.00; interquartile range, 2.00–3.50). More RNs (84 [96.6%]) than EPs (29 [82.9%]) reported that developing an ED policy or guideline for safe discharge after administration of opioids is important to clinical practice ($P = 0.02$). Only 8 physicians (23.5%) reported that they did not prescribe intramuscular morphine, and 15 (42.9%) reported that they did not prescribe intramuscular hydromorphone. EPs (7 [20.0%]) and RNs (3 [3.4%]) differed in regard to whether they were aware if any patients to whom they administered an opioid had experienced an adverse drug-related event ($P = 0.01$). Most EPs (24 [68.6%]) and RNs (54 [61.4%]) believed that the decision for patient discharge should be left to both the emergency medicine provider and the RN.

Implications: Most study participants believed that developing a policy or guideline for safe discharge after administration of opioids in the ED is important to clinical practice. Only a few physicians reported that they did not prescribe intramuscular hydromorphone or morphine. Most participants believed the discharge decision after administration of opioids in the ED should be primarily determined by both the emergency medicine provider and the RN. (*Clin Ther.* 2018;40:214–223) © 2018 Elsevier HS Journals, Inc. All rights reserved.

Key words: analgesics, opiate, opioid, safe discharge.

INTRODUCTION

In the United States, approximately 105 people die of drug exposures on a daily basis.¹ More than 2 million emergency department (ED) visits annually result from drug misuse and abuse.¹ Drug-related deaths due to prescription analgesics such as opioids have now surpassed trauma as the leading cause of injury deaths.² In 2012, a total of 2937 cases of fatal poisonings were reported to the National Poison Data System; the primary substance implicated was a pharmaceutical.³ Of these, abused prescription drugs, primarily opioids, were implicated, including methadone, oxycodone, acetaminophen/hydrocodone,

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morphine, fentanyl, tramadol, and oxycodone/acetaminophen.³ Even worse, the drug-related death rates are increasing; they have nearly quadrupled since 1999.⁴

According to the Agency for Healthcare Research and Quality, the problem has become much broader, with hospitalizations increasing among middle-aged and older age groups.⁵ In addition, there has been a significant increase in both pain-related US ED visits and prescriptions for opioid analgesics during the past decade.⁶ Between 2001 and 2010, Mazer-Amirshahi et al⁶ noted hydromorphone and oxycodone had the greatest increase in ED administration, and oxycodone and hydrocodone had the largest increases in discharge prescriptions. Interestingly, there was no difference in discharge prescriptions for nonopioid analgesics during the same period.⁶ In a recent study of 27,516 ED patient visits during a single week across the country, 17% of discharged patients were prescribed opioid pain relievers.⁷

Coupled with these increases in prescription use and misuse, iatrogenic injury due to opioid analgesic administration in the ED has recently been examined. In 2015, Beaudoin et al⁸ identified 73 ED patients in 2 urban academic EDs in which naloxone administration was required because of iatrogenic overdose after opioid administration. Patient-, provider-, and systems-based risk factors included chronic medical conditions; failure to adjust dosing in the elderly, and renal and hepatic impairment; multiple doses and routes of administration; co-administration of sedatives; problems with patient hand-offs; consideration of patient sex; and pharmacy error.⁸ In 2012, the Joint Commission recommended initiating policies and procedures for reducing adverse events with opioids for inpatients, yet interestingly it failed to specifically address the subset of patients who receive opioids in the ED and are then discharged.⁹

Intriguingly, the postanesthesia care unit has similar features to the ED in terms of treating acute pain with subsequent discharge, along with the potential for opioid-associated adverse drug events. General guidelines and recommendations for discharge of the postoperative patient after opioid administration have existed for the postanesthesia care unit, unlike the ED, by groups, including the American Society of Perianesthetic Nurses ([Appendix I](#)) and the American Society of Anesthesiologists.¹⁰ The American Society

of Perianesthetic Nurses has recommended a more specific time frame by which to discharge the postoperative patient based on pharmacokinetic parameters.¹⁰ The American Society of Anesthesiologists has not recommended a mandatory observation period after medication administration but instead has recommended that “patients should be observed until they are no longer at risk for cardiorespiratory depression and discharge criteria should be designed to minimize the risk of central nervous system or cardiorespiratory depression after discharge.”¹¹ Clearly, both organizations addressed the issue of patient discharge after opioid administration, albeit in a slightly different manner.

Other often overlooked yet significant problems associated with patients receiving opioid medications in the ED and subsequently being discharged (with or without prescriptions) include falls and impairment while performing complex motor tasks.¹² McIntosh and Leffler¹³ noted that 7% of patients who received opioid analgesics after discharge from the ED “drove a vehicle while under the influence of the drug.” In addition, sex-specific guidelines for patient discharge have not been developed, a particular gap in the scientific literature because sex-specific differences in drug offloading (eg, males have a more rapid onset and offset of morphine than females) have been documented.¹⁴

Regarding these clear deficiencies in the ED discharge process after opioid administration, Wolf et al¹⁵ recently published a survey of emergency nurses (RNs) that revealed the perception that determination of readiness for discharge after a patient has received Schedule II or III narcotics in the ED is largely left up to the nursing staff. Participants suggested that development of policies and checklists to assist in decision making related to discharge readiness would be useful for both RNs and patients.¹⁵

We hypothesized that there would be significant variability among perceptions and practices regarding discharging ED patients after opioid administration among emergency medicine (EM) clinical care providers. This study aimed to determine the current attitudes, perceptions, and practices of attending emergency physicians (EPs), physician assistants (PAs), nurse practitioners (CRNPs), and RNs regarding the discharge of adult patients after administration of opioid analgesics.

METHODS

After institutional review board approval, a cross-sectional survey (Appendix II) was administered to staff at 3 network hospital sites in northeastern Pennsylvania with a combined annual ED census of >180,000 visits per year. The network provides care at these clinical sites, 2 of which are suburban campuses and 1 an inner-city facility. One of the suburban sites hosts an affiliated 4-year EM residency program. For data analysis purposes, PAs and CRNPs who responded were combined into an advanced practice clinician (APC) group. All EM attending physicians, APCs, and RNs who worked at any of the network's 3 sites were eligible to participate.

A survey was developed by the study team. The face validity of the survey was assessed by approximately 15 senior residents (postgraduate year 4) at the network and APCs and RNs from nearby hospitals. These respondents' answers were not included in the analysis data set. After minor clerical and grammar changes were made, the survey was prepared for distribution. An email that explained the study's objective and procedures, that recipient response was voluntary and part of a research study, and with an embedded link to an online survey via Survey Monkey was sent to all eligible study participants. This self-administered survey consisted of 23 multiple choice questions and took approximately ≤ 15 minutes to complete. Study participants were sent 2 reminder emails, approximately 2 weeks apart, as a follow-up to ensure as high a response rate as possible.

Response rates were calculated based on the American Association for Public Opinion Research standard definitions (2016).¹⁶ Questions 3 and 19 were excluded from the response rate calculation because these were qualitative answer responses that further described a prior question. Question 1 was counted as complete as long as the respondent ranked one of the factors. The calculation method used included partial responses, which were counted as responses to the survey.

Descriptive statistics were used to summarize the data and presented by group based on whether the respondent was an EP, APC, or RN. For analysis purposes, PAs and CRNPs were combined into the APC category because the number of respondents in each category was very small (12 and 2, respectively). Because of the small number of APCs, the analysis of their responses was restricted to descriptive statistics only.

Because all the questions were categorical, numbers and percentages were calculated for each response to each question. The χ^2 test for independence was used to assess for any statistically significant differences between the physicians and RNs. If any of the expected data cell counts were <5, the Fisher exact test was used instead.

To test our hypothesis, questions 2, 3, 14, 15, 16, 17, and 18 were analyzed to determine whether perceptions were different between the 2 groups, and questions 1, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13 were used to assess whether actual practice was different between the 2 groups. $P < 0.05$ was considered statistically significant, and all tests were 2-tailed. SAS software, version 9.3 2 (SAS Institute, Cary, North Carolina) was used for the analysis.

RESULTS

Fifty-nine attending, board-certified/board-eligible EPs, 233 emergency RNs, and 23 APCs who worked at the 3 sites were approached to participate in the survey. A total of 163 respondents took the survey for an overall response rate of 51.7%. Specific response rates by credentials were as follows: 59.3% ($n = 35$) for EPs, 37.8% ($n = 88$) for RNs, and 60.9% ($n = 14$) for APCs. Most participants were female (95 [69.9%]). Only 10 participants (7.3%) were 18 through 24 years old, 34 (24.8%) were 25 through 30 years old, 41 (29.9%) were 31 through 40 years old, 32 (23.4%) were 41 through 50, years old and the remaining 20 (14.6%) were >51 years old. Regarding years of experience since professional health care graduation, 54 (39.1%) participants had >10 years, 34 (24.6%) had >5 to 10 years, 43 (31.2%) had 1 to 5 years, and only 7 (5.1%) had <1 year. Table I gives a breakdown of the demographic characteristics by credentials.

A statistically significant difference in age was found between physicians and RNs ($P < .01$); RNs tended to be younger than the EPs. A statistically significant difference in sex was found between physicians and RNs. Most physicians were male (23 [65.7%]), whereas most RNs were female (72 [82.8%]) ($P < .01$). In addition, the physicians appeared to have more clinical experience since graduation (21 [60.0%] with >10 years) than the nurses (27 [30.7%] with >10 years). This difference in experience was also statistically significant ($P = 0.01$).

Table I. Patient demographic characteristics by credentials.

Characteristic	APCs (n = 14)	Physicians (n = 35)	RNs (n = 88)	P (Comparison of Physicians and RNs)
Age group, y				<0.01
18–24	0 (0.0)	0 (0.0)	10 (11.4)	
25–30	7 (53.9)	0 (0.0)	27 (30.7)	
31–40	3 (23.1)	10 (28.6)	28 (31.8)	
41–50	2 (15.4)	16 (45.7)	14 (15.9)	
> 51	1 (7.7)	9 (25.7)	9 (10.2)	
Sex				<0.01
Male	3 (23.1)	23 (65.7)	15 (17.2)	
Female	10 (76.9)	12 (34.3)	72 (82.8)	
Experience, y				<0.01
< 1	1 (7.1)	0 (0.0)	6 (6.8)	
1–5	5 (35.7)	4 (11.4)	34 (38.6)	
> 5–10	3 (21.4)	10 (28.6)	21 (23.9)	
> 10	5 (35.7)	21 (60.0)	27 (30.7)	

APCs = advanced practice clinicians; RNs = nurses.

Perception Questions

The factor ranked most important to consider when discharging a patient from the ED after administration of opioids was the patient's functional status and vital signs in the ED (median, 2.00; interquartile range, 1.00–4.00). The factor ranked least important, excluding the "other" answer option, was time of day (median, 7.00; interquartile range, 5.00–7.00). Most of the EPs (18 [51.4%]) and RNs (38 [43.2%]) thought that the existing discharge decision after a patient was administered an opioid was left up to both the EM provider (EP, PA, or CRNP) and the RN, whereas 14 EPs (40.0%) and 35 RNs (39.8%) said it was left up to the EM provider alone. Only 3 EPs (8.6%) and 15 RNs (17.1%) thought it was left solely up to the RN. These differences were not statistically significant ($P = 0.45$).

Responses to the question regarding who respondents believed should be responsible for a patient's discharge after receiving opioids in the ED followed a similar pattern. Most EPs (24 [68.6%]) and RNs (54 [61.4%]) thought the decision should be left to both the EM provider and the RN, 10 EPs (28.6%) and 28 RNs (31.8%) thought it should be solely up to the EM provider, and only 1 EP (2.9%) and 6 RNs (6.8%) thought it should be left to only the nurse. Again,

these differences were not statistically significant ($P = 0.61$).

A slightly larger percentage of EPs (11 [31.4%]) compared with RNs (18 [20.7%]) were aware of any national clinical policies or guidelines that addressed safe discharge from the ED after administration of opioids, but this difference lacked statistical significance ($P = 0.21$). There was a statistically significant difference between EPs and RNs regarding the perception that developing a policy or guideline for safe discharge after opioid administration is important to clinical practice ($P = 0.02$). Although 84 RNs (96.6%) thought this was important, only 29 EPs (82.9%) thought this. There was also a statistically significant difference between EPs (7 [20.0%]) and RNs (3 [3.4%]) regarding whether they were aware of any patients to whom they had administered an opioid who experienced an adverse drug-related event ($P = 0.01$). [Table II](#) contains a list of all responses to perception-related questions by credentials.

Practice Questions

With regard to clinical practice, a statistically significant difference was found in the administration of intramuscular hydromorphone between EPs and

Table II. Perception survey responses by credentials.

Question	No. (%) of Respondents			P (Comparison of Physicians and RNs)
	APCs (n = 14)	Physicians (n = 35)	RNs (n = 88)	
Difference between orally, intravenously, and intramuscularly administered opioids in terms of discharging a patient from the ED	11 (78.6)	28 (80.0)	69 (78.4)	0.85*
Aware of any national, clinical policies or guidelines addressing safe discharge from the ED after administration of opioids	5 (35.7)	11 (31.4)	18 (20.7)	0.21*
Developing a policy or guideline for safe discharge after administration of opioids in the ED is important to clinical practice	14 (100.0)	29 (82.9)	84 (96.6)	0.02†
Current discharge decision after administration of opioids in the ED is primarily left to				0.45*
Provider (physician, physician assistant, or nurse practitioner)	4 (28.6)	14 (40.0)	35 (39.8)	
RN	0 (0.0)	3 (8.6)	15 (17.1)	
Both	10 (71.4)	18 (51.4)	38 (43.2)	
Responsibility to whom discharge after administration of opioids in the ED should be left				0.61*
Provider (physician, physician assistant, nurse practitioner)	5 (35.7)	10 (28.6)	28 (31.8)	
RN	0 (0.0)	1 (2.9)	6 (6.8)	
Both	9 (64.3)	24 (68.6)	54 (61.4)	
Aware of any patient to whom you administered an opioid during ED visit and then was discharged and experienced an adverse drug-related event	2 (14.3)	7 (20.0)	3 (3.4)	0.01†

APCs = advanced practice clinicians; ED = emergency department; RNs = nurses.

*Calculated using the χ^2 test.

†Calculated using the Fisher exact test.

RNs ($P = 0.01$). More EPs (15 [42.9%]) than RNs (16 [18.4%]) responded that they do not prescribe or administer intramuscular hydromorphone. On discharge of a patient, who not only received opioids in the ED but was given a prescription for them, a greater number of RNs (85 [96.6%]) than EPs (28

[80.0%]) indicated they routinely provide instructions for when to take the next dose ($P = 0.01$). There was a lack of consensus between EPs and RNs ($P = 0.03$) as to how long a patient should wait to take the first opioid dose after discharge. Half (14 [50.0%]) of the EPs stated they tell a patient to take the first dose after

Table III. Practice survey responses by credentials.

Question	No. (%) of Respondents			P (Comparison of Physicians and RNs)
	APCs (n = 14)	Physicians (n = 35)	RNs (n = 88)	
On average, how long do you wait before discharging patients after administration of...				
Intramuscular hydromorphone				0.01*
0–30 min	0 (0.0)	2 (5.7)	5 (5.8)	
31–60 min	3 (21.4)	1 (2.9)	23 (26.4)	
61–120 min	0 (0.0)	8 (22.9)	18 (20.7)	
> 120 min	0 (0.0)	4 (11.4)	13 (14.9)	
I do not use any specific time frame	1 (7.1)	5 (14.3)	12 (13.8)	
I do not prescribe or administer this medication	10 (71.4)	15 (42.9)	16 (18.4)	
Intravenous hydromorphone				0.18*
0–30 min	0 (0.0)	0 (0.0)	2 (2.3)	
31–60 min	2 (14.3)	5 (14.3)	19 (21.6)	
61–120 min	4 (28.6)	14 (40.0)	24 (27.3)	
> 120 min	0 (0.0)	7 (20.0)	27 (30.7)	
I do not use any specific time frame	3 (21.4)	6 (17.1)	15 (17.1)	
I do not prescribe or administer this medication	5 (35.7)	3 (8.6)	1 (1.1)	
Intramuscular morphine				0.20*
0–30 min	1 (7.7)	2 (5.9)	4 (4.6)	
31–60 min	3 (23.1)	4 (11.8)	26 (29.6)	
61–120 min	1 (7.7)	11 (32.4)	24 (27.3)	
> 120 min	0 (0.0)	5 (14.7)	9 (10.2)	
I do not use any specific time frame	2 (15.4)	4 (11.8)	15 (17.1)	
I do not prescribe or administer this medication	6 (46.2)	8 (23.5)	10 (11.4)	
Intravenous morphine				0.81†
0–30 min	0 (0.0)	1 (2.9)	3 (3.5)	
31–60 min	6 (42.9)	9 (25.7)	25 (28.7)	
61–120 min	3 (21.4)	14 (40.0)	25 (28.7)	
> 120 min	2 (14.3)	7 (20.0)	20 (23.0)	
I do not use any specific time frame	3 (21.4)	4 (11.4)	14 (16.1)	
I do not prescribe or administer this medication	–	–	–	
Intravenous fentanyl				0.30*
0–30 min	0 (0.0)	3 (8.6)	2 (2.3)	
31–60 min	5 (35.7)	15 (42.9)	30 (34.9)	
61–120 min	3 (21.4)	9 (25.7)	28 (32.6)	
> 120 min	1 (7.1)	5 (14.3)	10 (11.6)	
I do not use any specific time frame	3 (21.4)	3 (8.6)	16 (18.6)	

(continued)

Table III. (continued).

Question	No. (%) of Respondents			P (Comparison of Physicians and RNs)
	APCs (n = 14)	Physicians (n = 35)	RNs (n = 88)	
I do not prescribe or administer this medication	2 (14.3)	0 (0.0)	0 (0.0)	
Oral opiates or opioids				0.46 [†]
0–30 min	7 (50.0)	10 (28.6)	26 (29.6)	
31–60 min	3 (21.4)	5 (14.3)	21 (23.9)	
61–120 min	1 (7.1)	9 (25.7)	12 (13.6)	
> 120 min	0 (0.0)	3 (8.6)	11 (12.5)	
I do not use any specific time frame	3 (21.4)	8 (22.9)	18 (20.5)	
I do not prescribe or administer this medication	–	–	–	
If patient is administered opiates or opioids in ED and prescribed opiates or opioids at discharge, do you routinely provide instructions when to take next dose?	11 (78.6)	28 (80.0)	85 (96.6)	0.01 [*]
How long do you tell patient to wait before taking first dose?				0.03 [*]
Within 2 hours of discharge	0 (0.0)	1 (3.6)	3 (3.6)	
After 2 hours but before 4 hours after discharge	1 (9.1)	3 (10.7)	1 (1.2)	
After 4 hours but before 6 hours after discharge	5 (45.5)	14 (50.0)	25 (30.1)	
After 6 hours after discharge	5 (45.5)	5 (17.9)	21 (25.3)	
Other	0 (0.0)	5 (17.9)	33 (39.8)	
Do you routinely consider whether patient is opiate/opioid naive on prescription or administration of opiates or opioids in the ED?	11 (78.6)	34 (97.1)	76 (86.4)	0.11 [*]
Does your ED limit the total number of opiates or opioids a patient receives in the ED?	3 (21.4)	5 (14.3)	26 (29.6)	0.08 [†]

APCs = advanced practice clinicians; ED = emergency department; RNs = nurses.

*Calculated using the Fisher exact test.

†Calculated using the χ^2 test.

4 hours but before 6 hours, whereas only 25 RNs (30.1%) did so. More RNs (33 [39.8%]) than the EPs (5 [17.9%]) responded “other” for this same question. [Table III](#) contains a list of all the practice-related questions and participant responses by credentials.

DISCUSSION

Although variability was present among the sampling of EM providers, several themes were apparent. Most EM providers thought that developing a policy or guideline for safe discharge after administration of

opioids in the ED was important to clinical practice. With statistical significance, more RNs than EPs thought that developing a policy or guideline was an important goal. This is especially curious because, in contrast and with statistical significance, more EPs than RNs reported being aware of a patient who had received these medications, been discharged, and had experienced an adverse drug-related event. In addition, although EPs were more likely to be aware of adverse events, only a few of them reported that they did not prescribe intramuscular hydromorphone or morphine. This is despite the fact it is recognized and credibly reported that the intramuscular route has several disadvantages, is not the best choice from a patient tolerability perspective, and is not recommended for pain management in the ED.¹⁷ Specifically, the significant disadvantages of intramuscular opioid administration include unreliable onset of action, unpredictable effect, and inability to titrate dosing.¹⁷ Although some factors that increase patients' risk of harm include older age (ie, ≥ 65 years of age), diseases that affect the respiratory system (eg, asthma, chronic obstructive pulmonary disease) or cardiovascular system, concomitant use of respiratory-function depressants other than opioids, opioid-naive patients who are overweight, and patients with sleep disorders (eg, sleep apnea),¹⁸ there are no reliable pharmacokinetic data regarding intramuscular opioids and adverse events in the ED setting. Given these unpredictable and potentially dangerous problems and obviation with the more consistent and predictable effects of oral or intravenous administration, intramuscular opioid administration route should simply be avoided in the ED. Our study's findings suggest there is an opportunity for improvement in this unwise clinical practice habit.

In consideration of observation use after medication dosing, there were differences in EM provider responses. For instance, respondents seemed to have reasonable approaches of waiting some time before discharge and waiting additional time (most commonly 4–6 hours) after discharge before initiating the patient's first dose of opioid prescription medications. The patient's functional status in the ED was ranked as the most important factor in determining readiness for discharge. It is reassuring that team members recognize the importance of functional

status, especially considering in the United States falls are the leading cause of injury and death for older adults; the link between use of sedating medications and falls is readily apparent.¹⁹ Most practitioners believed that the discharge decision and the responsibility for discharge after opioid administration should be primarily determined by both the EM provider and the RN. This finding is further reassuring because in a culture of patient tolerability, this kind of team approach is ideal.²⁰

We believe that adverse drug reactions that involve opioids after ED discharge are likely underreported. A possible explanation of the apparent discrepancy between RN and physician responses to support for guideline development and knowledge of adverse drug reactions may be at least in part attributable to the differences in survey response rates between groups, the relatively small numbers, and possibly the different roles RNs and physicians play in the care of their patients.

This survey complements other recently published work^{21–23} and leads the way for future research that might include broadening the data pool and considering such responses at other institutions. More in-depth queries moving forward in this content area might also explore why the differences we found existed. Our findings are a logical first step to developing a clinical guideline or policy to help EPs and RNs determine the best and most appropriately safe discharge plan in the ED setting. Generally speaking, moving forward, authors would recommend key stakeholder meetings to develop consensus on a guideline. Undoubtedly, it would include basic constructs used by the American Society of Perianesthesia Nurses¹⁰ and incorporate key strategies, such as avoiding intramuscular and subcutaneous administration of these medications, appropriate timing recommendations considering concomitant medication use, and time of day that discharge occurred.

LIMITATIONS

This study was performed at a single network of hospitals in Northeastern Pennsylvania, and the results may not be geographically generalizable. In addition, a sex-specific analysis was not performed in this study. Sex of the respondent was statistically significantly associated with position, so sex-specific

analysis would have needed to take job position into account. Unfortunately, the cell sizes for position, broken down by sex, were too small to report confident results. A more robust sample size in which a greater number of male RNs and female physicians were surveyed would have allowed for this type of analysis and is an opportunity for future research. The small sample size might have limited the project's validity and the fact that we did not collect attitudes in correlation with the diagnosis of a visit. Although we queried responses related to the timing of medication administration, this alone may not be the only independent feature of the discharge process, and the effect of other considerations cannot be identified. Furthermore, although authors express concern regarding the intramuscular route disadvantages, risk-of-harm factors, lack of reliable pharmacokinetic data, and the suggestion of an opportunity for improvement, they recognize that the supporting data to make this a well-supported recommendation are not available.

In addition, the results represent only the views of those who were willing to take the voluntary survey. The response rate of the survey was less than optimal; opinions of those who did not respond cannot be assessed, and it is unclear what effect this potential nonresponse bias may have had on the results.

CONCLUSIONS

Most study participants believed that developing a policy or guideline for safe discharge after administration of opioids in the ED is important to clinical practice. Only a few physicians reported they did not prescribe intramuscular hydromorphone or morphine. A patient's functional status in the ED was ranked as the most important factor in determining readiness for discharge. Most participants believed the discharge decision and responsibility for discharge after opioid administration should be primarily determined by both the EM provider and the RN.

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CONFLICTS OF INTEREST

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SUPPLEMENTARY MATERIAL

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REFERENCES

1. Substance Abuse and Mental Health Services Administration. Highlights of the 2011 Drug Abuse Warning Network (DAEN) Findings on Drug-related Emergency Department visits. The DAWN Report. Rockville, MD: US Dept of Health and Human Services, Substance Abuse & Mental Health Services Administration; 2013. <http://www.samhsa.gov/data/2k13/DAWN127/sr127-DAWN-highlights.htm>. Accessed November 30, 2017.
2. Substance Abuse and Mental Health Services Administration. Results from the 2011 National Survey on Drug Use and Health: Summary of National Findings. Rockville, MD: Substance Abuse & Mental Health Services Administration; 2012. NSDUH Series H-44, HHS Publication No. (SMA) 12-4713. <http://archive.samhsa.gov/data/NSDUH/2k11results/nsduhresults2011.htm>. Accessed January 06, 2017.
3. Dart RC, Bronstein AC, Spyker DA, et al. Poisoning in the United States: 2012 emergency medicine report of the National Poison Data System. *Ann Emerg Med.* 2015;65:416-422.
4. CDC. Wide-ranging online data for epidemiologic research (WONDER). Atlanta, GA: CDC, National Center for Health Statistics; 2016. <http://wonder.cdc.gov>. Accessed January 06, 2017.

5. AHRQ Data Reveal Wider Impact of Opioid Overuse. Agency for Healthcare Research and Quality, Rockville, MD. <http://www.ahrq.gov/news/blog/ahrqviews/100914.html>. Published October 9, 2014. Accessed November 30, 2016.
6. Mazer-Amirshahi M, Mullins P, Rasooly I, et al. Rising opioid prescribing in adult U.S. emergency department visits: 2001-2010. *Acad Emerg Med*. 2014;21:236-243.
7. Hoppe JA, Nelson LS, Perrone J, et al. Prescribing Opioids Safely in the ED (POSED) Study Investigators. Opioid prescribing in a cross section of US emergency departments. *Ann Emerg Med*. 2015;66:253-259.
8. Beaudoin FL, Merchant RC, Janicki A, et al. Preventing iatrogenic overdose: a review of in-emergency department opioid-related adverse drug events and medications errors. *Ann Emerg Med*. 2015;5:423-431.
9. The Joint Commission of Accreditation of Healthcare Organizations. Safe Use of Opioids in Hospitals. *Sentinel Event Alert*. 2012;49.
10. ASPAN. "Frequently asked questions—How long should we keep patients in the PACU after they have received a narcotic?" <http://www.aspan.org/Clinical-Practice/FAQs#20>. Accessed November 30, 2016.
11. Practice Guidelines for post-anesthetic care. An updated report by the American Society of Anesthesiologists Task Force on Postanesthetic Care. *Anesthesia*. 2013;118:1-17.
12. Macintyre PE, Huxtable CA, Flint SL, et al. Costs and consequences: a review of discharge opioid prescribing for ongoing management of acute pain. *Anaesth Intensive Care*. 2014;42:558-574.
13. McIntosh SE, Leffler S. Pain management after discharge from the ED. *Am J Emerg Med*. 2014;22:98-100.
14. Sarton E, Olofsen E, Romberg R, et al. Sex differences in morphine analgesia: an experimental study in healthy volunteers. *Anesthesiology*. 2000;93:1245-1254.
15. Wolf LA, DeLao AM, Perhats C. Emergency Nurses' perceptions of discharge process for patients receiving Schedule II and III medications for pain management in the emergency department. *J Emergency Nursing*. 2015;41:221-226.
16. American Association for Public Opinion Research (AAPOR). 2016. Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. Retrieved from http://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf. Revised 2016. Accessed January 06, 2017.
17. Miner JR, Burton J. Pain management. Chapter 3. In: Marx J, Hockberger R, Walls R, eds. *Rosen's Emergency Medicine*. 9th ed. Philadelphia, PA: Saunders; 2018:43.
18. Pergolizzi J, Boger RH, Budd K, et al. Opioids and the management of chronic severe pain in the elderly: consensus statement of an International Expert Panel with focus on the six clinically most often used World Health Organization Step III opioids (buprenorphine, fentanyl, hydromorphone, methadone, morphine, oxycodone). *Pain Pract*. 2008;8:287-313.
19. CDC. Falls are leading cause of Injury and death in older Americans. <http://www.cdc.gov/media/releases/2016/p0922-older-adult-falls.html> Published 09/22/2016. Accessed December 09, 2016.
20. McNamara S. Patient Safety Requires a Team Approach. *AORN J*. 2010;92:466-468.
21. Nagel FW, Kattan JA, Mantha S, et al. Promoting health department opioid-prescribing guidelines in New York City emergency departments: a qualitative evaluation. *J Public Health Manag Pract*. 2017. [Epub ahead of print].
22. Poon SJ, Nelson LS, Hoppe JA, et al. Consensus-based recommendations for an emergency medicine pain management curriculum. *J Emerg Med*. 2016;51:147-154.
23. Motov SM, Nelson LS. Advanced concepts and controversies in emergency department pain management. *Anesthesiol Clin*. 2016;34:271-285.

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SUPPLEMENTARY MATERIAL

Appendix 1. American Society of Perianesthetic Nurses' Narcotic Administration Guidelines¹⁰

When evaluating a patient for discharge from Phase I or Phase II after a narcotic, several factors need to be kept in mind. These factors include what is the dosage, what is the route, what is the onset of action, when does the medication peak, what is the duration of the medication, and what is the half-life of the medication.¹⁻³

With IV medications, obviously there is a quicker onset and a shorter duration of action. Most IV medications, including Morphine, Dilaudid, and Fentanyl, have an onset of action of 1-5 minutes and peak within 5-20 minutes. The duration of action with Morphine and Dilaudid is 2-4 hours, while the duration of action of Fentanyl is 30 minutes to 1 hour. Morphine and Fentanyl have a half-life of 3-4 hours, while Dilaudid has a half-life of 2 hours.¹⁻³

Oral narcotics have an onset of 30-60 minutes, and peak in 60-90 minutes.¹⁻³

With this information in mind, the nurse must consider what is safe in terms of when the patient can transition to the next level of care. Since IV medications peak in 5-20 minutes, it is prudent for the nurse to use this interval to assess the patient for adverse respiratory effects. The nurse should also monitor the patient without any stimulation to determine how the patient may respond when moved to a quiet patient room without the added PACU environmental stimuli. Patients will generally desaturate when unstimulated. Ensuring that the patient can handle a narcotic without episodes of oxygen desaturation is a key to determining when it is safe to discharge/transfer a patient.

With oral narcotics, the nurse should ask the patient if he has taken the medication previously and if it was effective. If yes, the nurse can give the patient the narcotic with relative assurance that the patient will not suffer adverse effects and that it will provide pain relief. If the patient has not received the oral narcotic previously, the nurse can give it shortly before transitioning to Phase II. This allows time for the narcotic to take effect over 30-60 minutes and time for the nurse to evaluate the patient's response. So with this information in mind, what is the time frame for discharge after narcotics? Since most IV narcotics peak in 20 minutes, 30 minutes should allow sufficient time to observe for adverse respiratory effects. Waiting 30 minutes is generally a safe post administration interval before discharge from Phase I. With oral narcotics, the nurse can observe for effectiveness within 30-60 minutes of administration and the patient can transition home. These time frames allow the patient to progress to the next phase of care in a safe and effective manner.

Appendix 2 Survey Instrument Safe Discharge Survey

Perception and Practice among Emergency Medicine Healthcare Providers regarding Discharging Patients after Opiate or Opioid Administration (Active Survey)

Please help us by completing the following "Safe Discharge Survey;" *your feedback is critical and needed by June 30th*. Any questions you may have about this process may be directed to (blinded) for peer review. Thank you so much for your help!

- 1) Which of the following factors do you consider *most* important when discharging a patient from the ED after administration of opiates or opioids? Rank from most important (#1) to least important (#7). You may rank all 8 if "Other" is used.
- | | RANKING | |
|---|---------|-------|
| a. Pharmacokinetics | | _____ |
| b. Functional status and vital signs in the ED | | _____ |
| c. Response to the medication | | _____ |
| d. Social support (e.g., ride home, available caregivers) | | _____ |
| e. Time of day | | _____ |
| f. Co-morbidities | | _____ |
| g. Age | | _____ |
| h. Other, please describe: _____ | | _____ |
- 2) Do you feel there is a difference between orally-, intravenously- and intramuscularly-administered opiates or opioids in terms of discharging a patient from the ED?
- a. Yes
 - b. No
- 3) What do you feel is the difference?
- Please describe: _____
- 4) On average, how long do you wait before discharging patients after administration of **intramuscular (IM) hydromorphone**?
- a. 0-30 minutes
 - b. 31-60 minutes
 - c. 61-120 minutes
 - d. >120 minutes
 - e. I do not use any specific timeframe
 - f. I do not prescribe or administer this medication
- 5) On average, how long do you wait before discharging patients after administration of **intravenous (IV) hydromorphone**?
- a. 0-30 minutes
 - b. 31-60 minutes
 - c. 61-120 minutes
 - d. >120 minutes
 - e. I do not use any specific timeframe
 - f. I do not prescribe or administer this medication
- 6) On average, how long do you wait before discharging patients after administration of **intramuscular (IM) morphine**?
- a. 0-30 minutes
 - b. 31-60 minutes
 - c. 61-120 minutes
 - d. >120 minutes
 - e. I do not use any specific timeframe
 - f. I do not prescribe or administer this medication
- 7) On average, how long do you wait before discharging patients after administration of **intravenous (IV) morphine**?

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- a. 0-30 minutes
 - b. 31-60 minutes
 - c. 61-120 minutes
 - d. >120 minutes
 - e. I do not use any specific timeframe
 - f. I do not prescribe or administer this medication
- 8) On average, how long do you wait before discharging patients after administration of **intravenous (IV) fentanyl**?
- a. 0-30 minutes
 - b. 31-60 minutes
 - c. 61-120 minutes
 - d. >120 minutes
 - e. I do not use any specific timeframe
 - f. I do not prescribe or administer this medication
- 9) On average, how long do you wait before discharging patients after administration of **oral opiates or opioids** (e.g., oxycodone, hydrocodone, tramadol, codeine)?
- a. 0-30 minutes
 - b. 31-60 minutes
 - c. 61-120 minutes
 - d. >120 minutes
 - e. I do not use any specific timeframe
 - f. I do not prescribe or administer these medications
- 10) If a patient is administered an opiate or opioid in the ED and then is prescribed opiates or opioids at the time of discharge, do you routinely provide instructions regarding when the next dose should be taken?
- a. Yes
 - b. No
- 11) How long would you tell the patient to wait before taking the first dose?
- a. Can take first dose immediately (<2 hours) post discharge
 - b. Can take first dose after 2 hours, but prior to 4 hours post discharge
 - c. Can take first dose after 4 hours, but prior to 6 hours post discharge
 - d. Can take first dose after 6 hours post discharge
 - e. Other, please describe: _____
- 12) Do you routinely consider if the patient is opiate/opioid naïve upon prescription or administration of opiate or opioids in the ED?
- a. Yes
 - b. No
- 13) Does your ED limit the total number of opiate or opioid administrations a patient receives in the ED?
- a. Yes
 - b. No
- 14) Are you aware of any national, clinical policies or guidelines that currently exist addressing the issue of safe discharge from the ED after administration of opiates or opioids?
- a. Yes
 - b. No

- 15) Do you feel that developing a policy or guideline for the safe discharge of patients after administration of opiates or opioids in the ED is important to clinical practice?
- Yes
 - No
- 16) Do you feel that the current patient discharge decision after administration of opiates or opioids in the ED is primarily left to the:
- Provider (Physician/Physician's Assistant/Nurse Practitioner)
 - Nurse
 - Both
- 17) Who do you feel should be responsible for the discharge of a patient after administration of opiates or opioids in the ED?
- Provider (Physician/Physician's Assistant/Nurse Practitioner)
 - Nurse
 - Both
- 18) Are you aware of any patient to whom you administered an opiate or opioid during the ED visit, and then was discharged and experienced an adverse drug event attributed to these medications?
- Yes
 - No
- 19) Briefly describe what happened:
-
- 20) What is your age?
- 18-24
 - 25-30
 - 31-40
 - 41-50
 - >51
- 21) What is your sex?
- Male
 - Female
- 22) How many years has it been since completion of your residency or graduation from nursing school?
- <1 year
 - 1-5 years
 - >5 years-10 years
 - >10 years
- 23) Are you a physician or a nurse?
- Physician
 - Physician's Assistant
 - Nurse Practitioner
 - Registered Nurse

References

1. Odom-Forren J. 6th ed. *Drain's Perianesthesia Nursing: A Critical Care Approach*. St. Louis, MO: Saunders, an imprint of Elsevier Inc; 2013;236–252:427–449.
2. Physicians' desk reference. 65th ed. Montvale, NJ: PDR Network; 2013.
3. Schick L, Windle P.E. *PeriAnesthesia Nursing Core Curriculum: Preprocedure, Phase I and Phase II PACU Nursing*. 2nd ed. St. Louis, MO: Saunders; 2010.