

Improving Management of Titratable Infusions in the ICU

Theresa Statkiewicz, BSN, RN, CCRN, Kelly Turner, MS, RN, Ed Chen, MD,
Julie Keenan, MSN, RN, CCRN
Johns Hopkins Bayview Medical Center

Introduction

Through monthly audits for Joint Commission survey preparation, we discovered that we had low compliance with administration instructions for titratable medications. The Joint Commission has specific guidelines for management and documentation of titratable medications. We identified a need to quickly increase compliance for administration of these medications in our ICU.

Purpose

The purpose of this project was to increase compliance with The Joint Commission guidelines for management and documentation of titratable infusions.

Methods

In the first phase, audits were expanded from general compliance of titratable medications with administration instructions to auditing by type of medication including opioids (fentanyl, hydromorphone), sedation (propofol, dexmedetomidine, benzodiazepines), and vasoactive infusions (norepinephrine, epinephrine, phenylephrine, nicardipine) to try to identify challenges to compliance with administration instructions. Every titration was evaluated for compliance with ordered administration instructions as well as documentation of pain score, Richmond Agitation-Sedation Scale (RASS) score, or mean arterial pressure (MAP) to support the need for titration. Initially, compliance was recorded as 'yes' if all titrations in a shift followed the administration instructions or 'no' if any titration deviated from the administration instructions. Nurses received real time follow up through email with opportunities for improvement or recognition through the applause system for 100% compliance for their shift. Observations were made on challenges with compliance to administration instructions throughout the process. Following 8 months of data collection, audits were paused to evaluate sustainability of increased compliance without routine follow-up and focus on using observations on challenges with compliance to submit an SBAR with suggested improvements to critical care joint practice council.

Audits were resumed six months later to evaluate current compliance with management of titratable medications. In this phase of auditing, we started keeping track of the total number of times infusions were titrated per patient in a shift, the number of times infusions were titrated following the administration instructions, and the number of times MAP, RASS, or pain score was documented. Routine follow up resumed with opportunities for improvement through email and recognition of 100% compliance for a shift.

Results

In the first phase of auditing, a total of 1,345 chart audits were completed, averaging 168 audits per month. Out of 297 audits for opioid infusions, only 150 audits were compliant with administration instructions and 147 audits had pain scores documented to support titrations. Of the 526 audits for sedative infusions, 434 were compliant with administration instructions and 336 documented RASS scores for these infusions. Of the 527 audits for vasoactive infusions, 399 were compliant with administration instructions and 352 documented MAPs to support titrations.

Month	Opioid			Sedation			Vasoactive		
	# audits	# audits 100% compliant with instructions	# pain scores documented	# audits	# audits 100% compliant with instructions	# RASS scores documented	# audits	# audits 100% compliant with instructions	# MAP documented
March 2022	57	22	16	81	59	48	68	46	33
April 2022	50	21	18	84	68	55	53	40	29
May 2022	35	14	23	62	57	46	83	60	53
June 2022	22	13	14	41	33	27	86	75	62
July 2022	15	4	3	33	29	18	25	20	16
August 2022	35	18	16	60	49	34	45	26	35
September 2022	43	24	24	94	80	68	83	64	63
October 2022	35	18	17	71	59	40	84	68	61

Table 1. Audit data recorded by shift compliance

In the second phase of auditing, a total of 7,022 titrations were audited, averaging 780 titrations per month. 297 titrations were audited for opioid infusions; 150 followed admin instructions and 147 titrations were supported by pain scores. 1,863 titrations were audited for sedative infusions; 1,734 titrations were compliant with instructions and 1,361 were supported by RASS scores. 4,862 titrations of vasoactive infusions were audited; 4,605 titrations were compliant with instructions and 4,397 were supported by MAPs.

Month	Opioid			Sedation			Vasoactive		
	# titrations	# titrations by instructions	# pain scores documented	# titrations	# titrations by instructions	# RASS scores documented	# titrations	# titrations by instructions	# MAP documented
May 2023	23	14	12	163	163	131	435	419	389
June 2023	15	7	11	151	138	128	324	302	283
July 2023	21	15	15	101	92	73	290	271	275
August 2023	17	5	9	65	65	18	198	174	168
October 2023	13	8	5	206	185	148	294	283	262
November 2023	46	13	16	304	295	217	599	573	564
December 2023	42	30	29	277	258	211	1190	1145	1097
January 2024	49	23	24	307	289	220	598	579	558
February 2024	71	35	26	289	249	215	934	859	801

Table 2. Audit data recorded by individual titrations

Evaluation

In the first phase of auditing, compliance with administration instructions for opioid infusions increased from 39% in March 2022 to a maximum of 59% in June 2022. Compliance with documentation of pain scores increased from 28% to a maximum of 66% in May 2022. Compliance with administration instructions for sedative infusions increased from 73% in March 2022 to a maximum of 92% in May 2022. Compliance with documentation of RASS scores increased from 59% to a maximum of 74% in May 2022. Compliance with administration instructions for vasoactive infusions increased from 68% to a maximum of 87% in June 2022. Compliance with documentation of MAPs increased from 49% to a maximum of 78% in August 2022.

In the second phase of auditing, compliance with administration instructions for opioid infusions increased ranged from 28% to a maximum of 71% in July 2023 and December 2023. Compliance with pain score documentation ranged from 35% to 73%. Compliance with administration instructions for sedative infusions ranged from 86% to 100% and documentation of RASS scores increased from 28% to 93%. Compliance with administration instructions for vasoactive infusions ranged from 88% to 97% and documentation of MAPs ranged from 85% to 95%.

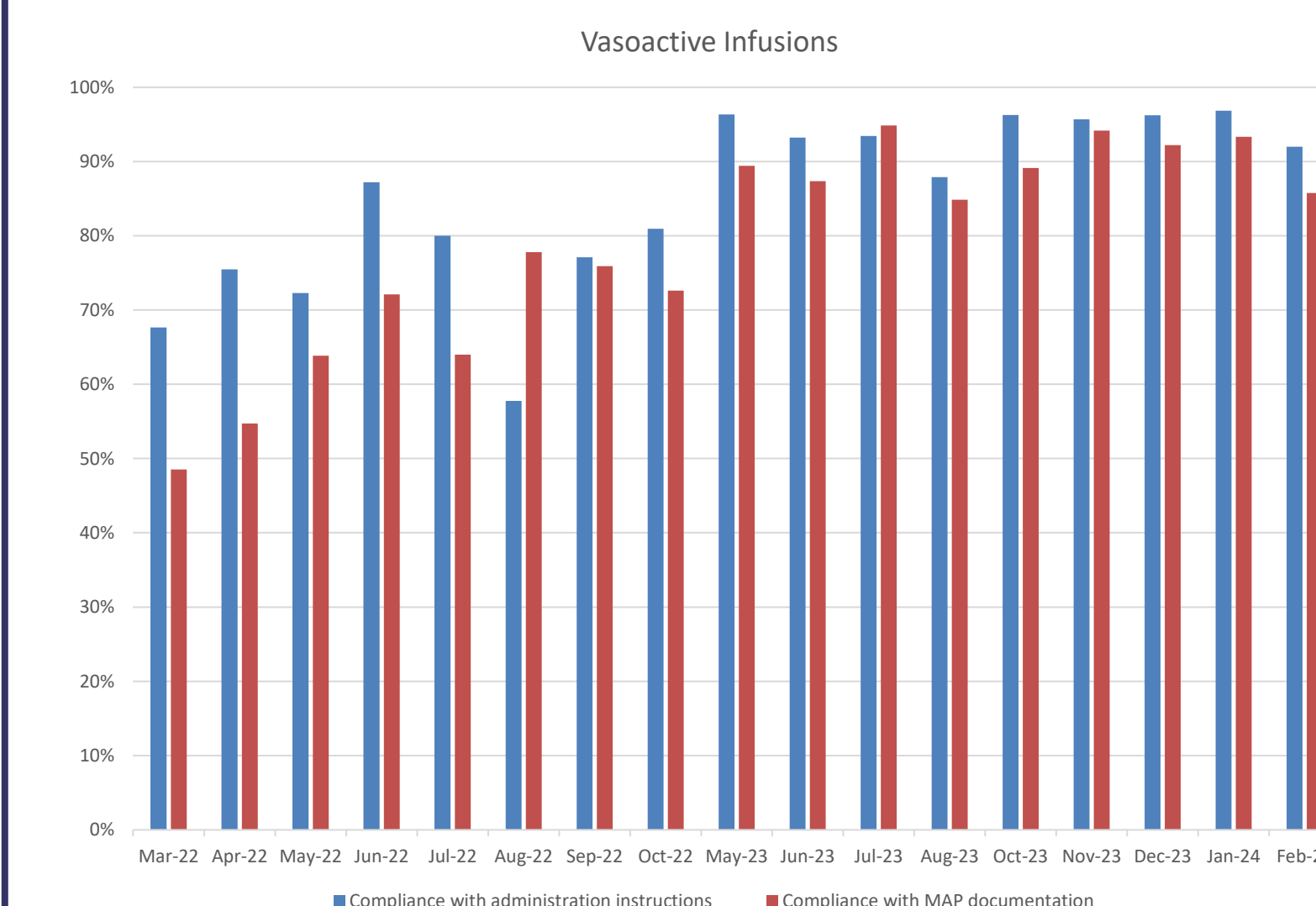


Figure 2 – Compliance for Vasoactive Infusions

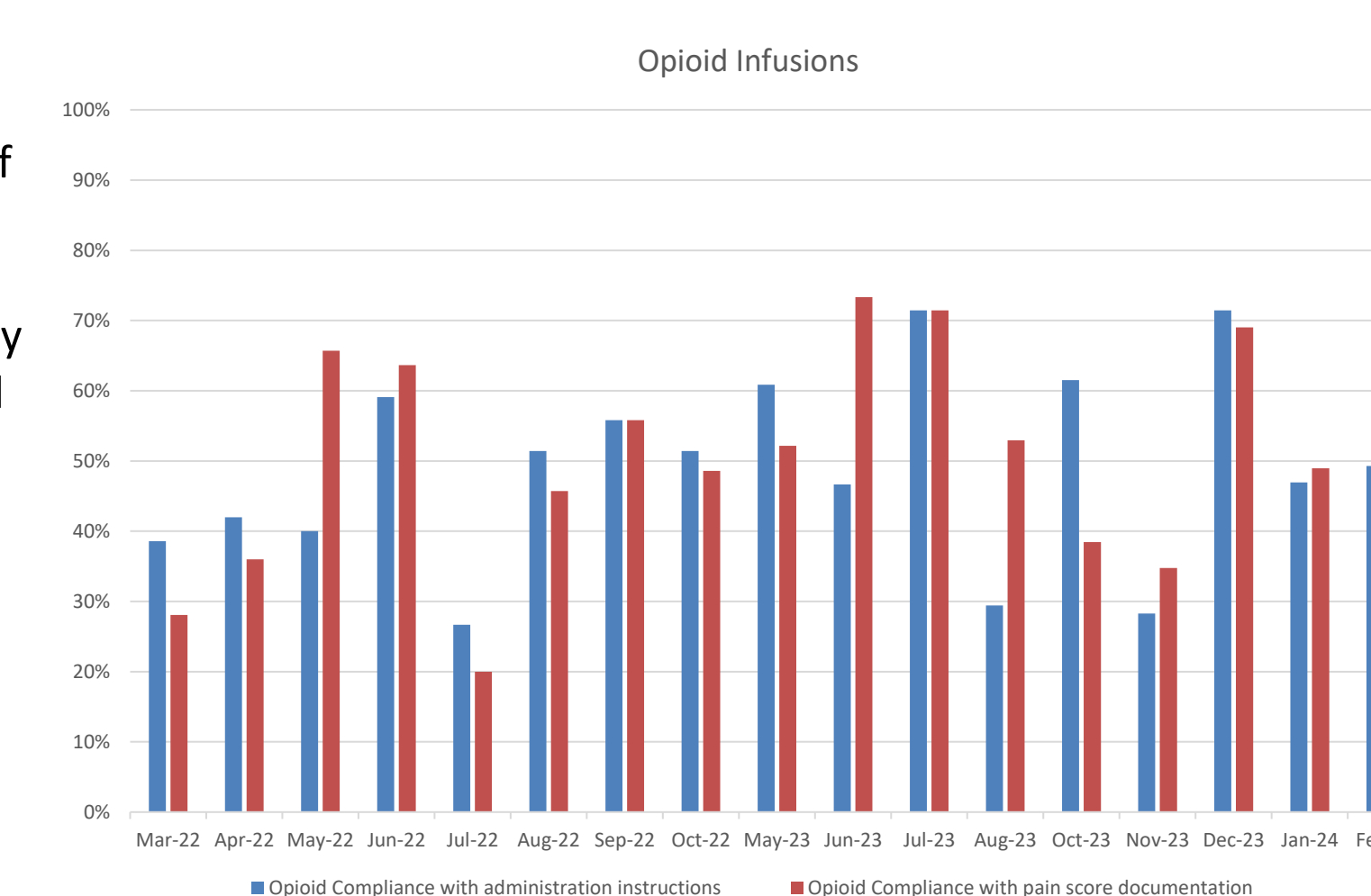


Figure 1 – Compliance for Opioid Infusions

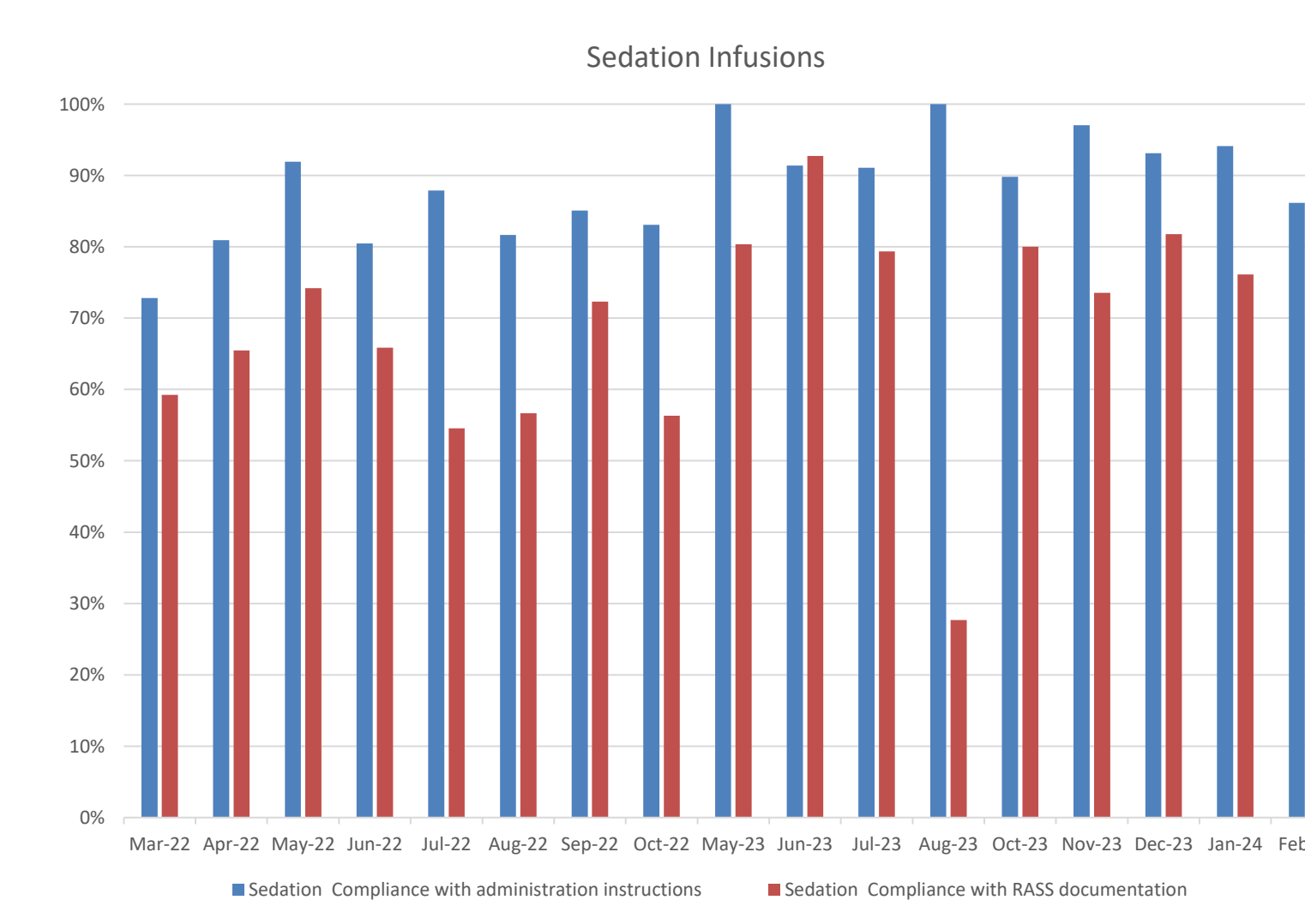


Figure 3 – Compliance for Sedation Infusions

Practice Implications

Observations and data collected from these audits in addition to research on guidelines from The Joint Commission led to significant changes to practice and management of titratable medications including:

October 2022: SBAR was submitted to critical care joint practice council identifying challenges to compliance with fentanyl administration instructions and recommendations for change.

- Increasing dose after 2 boluses, seeing the "2" and missing the ">" – change instructions to "greater than or equal to" or "if 3 boluses are needed within 1 hour, increase by [dose]"
- When decreasing by ½, calculations are being done incorrectly or rounding to a standard dose – change order to decrease by increments of 25 or decrease in smaller increments
- Increasing by 50 mcg and decreasing by ½ is not tolerated by every patient – change to titrate by range 12.5-75 mcg

April 2023: New administration instructions were agreed on and request to update EMR was placed. Changes include using the language "2 or more boluses" instead of ">2" and titrating by 12.5-50 mcg.

June 2023: New titration of continuous medication policy approved by patient care practices council (PCP) for approval. Publication of policy pending EMR changes.

October 2023: Request submitted to critical care specialty council for updates to vasoactive infusion order administration instructions to include range orders for titration.

January 2024: Formation of titration workgroup including representatives from regulatory, clinical informatics, provider leadership, nursing leadership, and pharmacy. Request for fentanyl changes in EMR was escalated.

February 2024:

- New fentanyl order live in EMR
- Titration policy approved by PCP and sent for signature
- Request for EMR changes to vasopressor administration instructions with ranges
- Multiple propofol orders with different administration instructions available in EMR – request to JPC to harmonize propofol administration instructions
- Midazolam, hydromorphone, and morphine administration instructions were formatted like the old fentanyl infusion instructions - request to JPC to update those infusion instructions with the same structure as the new fentanyl order including ranges

Conclusions

Compliance with administration instructions and required documentation for titratable medications improved with daily audits, routine follow up with opportunities for improvement, and recognition of 100% compliance. Even though compliance increased, we still had room for improvement. We are already seeing significantly higher compliance with the few changes that are currently live in the EMR and hope to continue to see improvements with the changes that are coming in the next few months. Daily audits with follow up will remain part of the plan to improving compliance even further.

References

- Barden, C., & Campbell, R. (2021, December 14). Expectations for Implementing Medication Titration Orders. American Association of Critical-Care Nurses. other. Retrieved November 22, 2022, from https://www.youtube.com/watch?v=rehVLEl9rc&feature=emb_imp_woyt
- The Joint Commission Clarifies Expectations for Implementing Medication Titration Orders. (2020). Joint Commission Perspectives, 40(6), 7-9. Retrieved November 22, 2022, from <https://www.aacn.org/~media/aacn-website/nursing-excellence/nurse-stories/titration-article.pdf?la=en>.
- Medication Administration - Range Orders. The Joint Commission. (2021, October 21). Retrieved November 22, 2022, from <https://www.jointcommission.org/standards/standard-faqs/hospital-and-hospital-clinics/medication-management-mm/000002153/>
- Medication Administration - Titration Orders. The Joint Commission. (2022, January 4). Retrieved November 22, 2022, from <https://www.jointcommission.org/standards/standard-faqs/hospital-and-hospital-clinics/medication-management-mm/000002114/>