

Improving the ASA Physical Status Classification Accuracy for Emergency Surgeries: A Quality Improvement Process

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Introduction

- The American Society of Anesthesiologists Physical Status (ASA PS) classification system defines emergency surgery as existing when delay in treatment of the patient would lead to a significant increase in threat to life or body part. Accurate documentation of ASA PS status including emergency is required for precise calculation of hospital case mix index and medical coding/billing.
- Electronic medical record (EMR) macros can increase efficiency, however they are also prone to increasing documentation omissions.
- In this study, we aim to improve our institution's EMR (EPIC®) workflow and reduce documentation error of emergency surgery by anesthesiology providers.
- We hypothesize that by simplifying the user interface for ASA PS data entry, the E modifier of emergency surgeries would be more consistently captured.

Methods

- As the **intervention** we modified EPIC®'s graphical user interface for the ASA PS and the emergency modifier classification from a two- to a one-mouse click process (**Fig. 1**). The EPIC® enhancements team implemented this change on October 14, 2020.
- Retrospective quantitative data analysis was performed using BusinessObjects® on surgical booking lead-time and ASA PS documented in EPIC® spanning 4 months before and after the change. (**Table 1.**) For the purposes of this analysis we defined emergency surgery as surgery booked within 12 hours from start of surgery. The presence or absence of the emergency modifier ("E") in the anesthesia record for all emergency cases was assessed.
- To assess validity of proposed temporal definition of emergency surgery, manual chart review on a random subset of data (200 total cases) collected was also performed.
- Chi square test was used for hypothesis testing (Graphpad.com)

Quality Improvement Intervention:

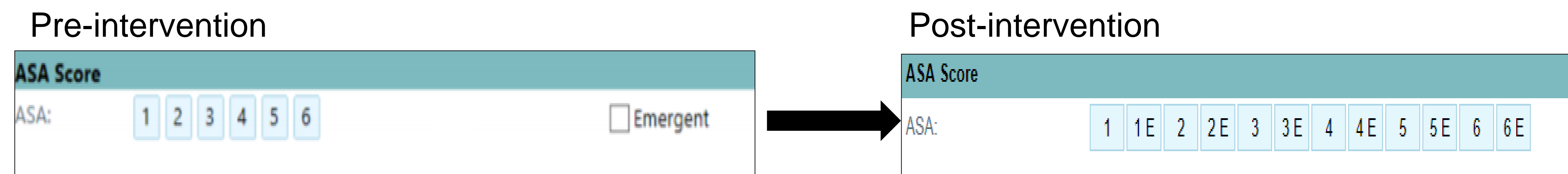


Figure 1. Intraoperative anesthesia record EPIC graphical user interface pre- (left) and post-intervention (right). The "Emergent" modifier required an extra mouse click prior to the implementation of the new one-click selection user interface.

Results

Count of Urgent/Emergent Cases (excluding ASA = 6)					% of Total: Urgent/Emergent Cases (excluding ASA = 6)				
Service Code Revised - HIS Svc	Pre: 6/18/2020 - 10/13/2020		Post: 10/14/2020 - 2/8/2021		Service Code Revised - HIS Svc	Pre: 6/18/2020 - 10/13/2020		Post: 10/14/2020 - 2/8/2021	
	Correct	Incorrect	Correct	Incorrect		Correct	Incorrect	Correct	Incorrect
Acute Care Surgery	181	152	191	137	54%	46%	58%	42%	
Adult Interventional Cardiology				1				100%	
Burn Surgery	17	13	20	6	57%	43%	77%	23%	
Cardiovascular Surgery	32	20	33	10	62%	38%	77%	23%	
Congenital Heart Center	10	8	4	11	56%	44%	27%	73%	
Dentistry		1				100%			
General Surgery	25	31	18	18	45%	55%	50%	50%	
Gynecology	82	68	79	53	55%	45%	60%	40%	
Medicine Gastroenterology		1	2	1		100%	67%	33%	
Neurosurgery	112	91	118	67	55%	45%	64%	36%	
Ophthalmology	20	23	24	14	47%	53%	63%	37%	
Oral Surgery	7	9	12	2	44%	56%	86%	14%	
Orthopaedics	122	109	149	118	53%	47%	56%	44%	
Other Services	5	6	3	1	45%	55%	75%	25%	
Otolaryngology	27	21	19	24	56%	44%	44%	56%	
Pain Management	1	2		1	33%	67%		100%	
Pediatric Gastroenterology	3	3	2	5	50%	50%	29%	71%	
Pediatric Hematology Oncology				2				100%	
Pediatric Surgery	72	77	69	61	48%	52%	53%	47%	
Plastic & Reconstr Surgery	12	15	18	14	44%	56%	56%	44%	
Thoracic Surgery	24	22	15	29	52%	48%	34%	66%	
Transplant Surgery	20	29	26	21	41%	59%	55%	45%	
Trauma Surgery	39	19	17	8	67%	33%	68%	32%	
Urology	50	42	46	49	54%	46%	48%	52%	
Vascular Surgery	63	73	64	56	46%	54%	53%	47%	
Grand Total	924	835	929	709	53%	47%	57%	43%	

Table 1. Quality improvement documentation intervention analysis in numerical (left panel) and percentage (right panel) format across 25 surgical service codes for emergent cases performed between 06/18/2020 – 02/08/2021. Correct cases (green) are defined as those that are booked ≤12 hours from start of surgery **and** have ASA PS E modifier attribution in the anesthesia record. Correct and incorrect (red) cases are shown before and after the documentation improvement intervention.

Chi-Square statistics: 9.119 with 1 degree of freedom, two tailed $p=0.0025$. Chi-square test was based on observed total correct cases in the post-intervention phase vs expected correct cases (derived from pre-intervention percentage)

Discussion

- After implementing a simple change in the data entry user interface for ASA PS correct documentation improved by 4% from 53% to 57%.
- Manual retrospective chart review found that although a temporal definition of surgical emergency may not be fully accurate at predicting emergency surgery, the occurrence of elective surgery scheduled ≤12 hours from start of surgery was rare in our institution.

Conclusion

- Reducing mouse click burden by simplifying EMR data entry interface improves accuracy of ASA PS documentation for emergency surgeries in EPIC®.
- Future cycles of this quality improvement project will aim to further reduce cognitive load and provide EMR enhancements such as utilizing pop-up prompts when a discrepancy exists between surgical booking lead time and "Emergent" modifier documentation.

References

- American Society of Anesthesiologists. ASA Physical Status Classification System. <http://www.asahq.org/resources/clinical-information/asa-physical-status-classification-system>. Approved October 15, 2014. Accessed May 5, 2021.
- Mayhew D, Mendonca V, Murthy BVS. A review of ASA physical status – historical perspectives and modern developments. *Anaesthesia* 2019; 74:373-9